

**CPC****COOPERATIVE PATENT CLASSIFICATION****C07C****ACYCLIC OR CARBOCYCLIC COMPOUNDS****NOTE**

In this subclass, the following terms or expressions are used with meanings indicated:

- "bridged" means the presence of at least one fusion other than ortho, peri or spiro;
- two rings are "condensed" if they share at least one ring member, i.e. "spiro" and "bridged" are considered as condensed;
- "condensed ring system" is a ring system in which all rings are condensed among themselves;
- "number of rings" in a condensed ring system equals the number of scissions necessary to convert the ring system into one acyclic chain;
- "quinones" are compounds derived from compounds containing a six-membered aromatic ring or a system comprising six-membered aromatic rings (which system may be condensed or not condensed) by replacing two or four CH groups of the six-membered aromatic rings by C=O groups, and by removing one or two carbon-to-carbon double bonds, respectively, and rearranging the remaining carbon-to-carbon double bonds to give a ring or ring system with alternating double bonds, including the carbon-to-oxygen bonds; this means that acenaphthenequinone or camphorquinone are not considered as quinones.

In this subclass, in the absence of an indication to the contrary, a process is classified in the last appropriate place.

In this subclass, in the absence of an indication to the contrary, "quaternary ammonium compounds" are classified with the corresponding "non-quaternised nitrogen compounds".

For the classification of compounds in groups [C07C 1/00](#) to [C07C 71/00](#) and [C07C 401/00](#) to [C07C 409/00](#):

- a compound is classified considering the molecule as a whole (rule of the "whole molecule approach");
- a compound is considered to be saturated if it does not contain carbon atoms bound to each other by multiple bonds;
- a compound is considered to be unsaturated if it contains carbon atoms bound to each other by multiple bonds, which includes six-membered aromatic ring, unless otherwise specified or implicitly derivable from the subdivision.

For the classification of compounds in groups [C07C 201/00](#) to [C07C 395/00](#), i.e. after the functional group has been determined according to the "last place rule", a compound is classified according to the following principles:

- compounds are classified in accordance with the nature of the carbon atom to which the functional group is attached;
- a carbon skeleton is a carbon atom, other than a carbon atom of a carboxyl group, or a chain of carbon atoms bound to each other, a carbon skeleton is considered to be terminated by every bond to an element other than carbon or to a carbon atom of a carboxyl group;
- when the molecule contains several functional groups, only functional groups linked to the same carbon skeleton as the one first determined are considered;
- a carbon skeleton is considered to be saturated if it does not contain carbon atoms bound to each other by multiple bonds;
- a carbon skeleton is considered to be unsaturated if it contains carbon atoms bound to each other by multiple bonds, which includes a six-membered aromatic ring.

When classifying in this subclass, classification is also made in group [B01D 15/08](#) insofar as subject matter of general interest relating to chromatography is concerned.

When a process is classified in a process group, combination sets are used to indicate the product of the process. A combination set consists of a process group, followed by and linked to the group of the product. The products are selected from the corresponding product groups.

### **WARNING**

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[C07C 27/02](#) covered by [C07C 29/00](#), [C07C 51/00](#)  
[C07C 47/042](#), [C07C 47/045](#), [C07C 47/048](#), [C07C 47/052](#),  
[C07C 47/055](#), [C07C 47/058](#) covered by [C07C 47/04](#)  
[C07C 47/07](#), [C07C 47/09](#) covered by [C07C 47/06](#)  
[C07C 53/04](#) covered by [C07C 53/02](#)  
[C07C 57/045](#), [C07C 57/05](#), [C07C 57/055](#), [C07C 57/065](#),  
[C07C 57/07](#), [C07C 57/075](#) covered by [C07C 57/04](#)  
[C07C 69/025](#), [C07C 69/03](#), [C07C 69/035](#) covered by  
[C07C 69/003](#) to [C07C 69/017](#) and [C07C 69/02](#)[C07C 69/347](#),  
[C07C 69/353](#) covered by [C07C 69/003](#) to [C07C 69/017](#)  
and [C07C 69/34](#)[C07C 69/527](#) covered by [C07C 69/003](#) to  
[C07C 69/017](#) and [C07C 69/52](#)[C07C 69/767](#), [C07C 69/773](#) covered  
by [C07C 69/003](#) to [C07C 69/017](#) and [C07C 69/76](#)[C07C 69/83](#)  
covered by [C07C 69/003](#) to [C07C 69/017](#) and [C07C 69/82](#)

**Guidance heading:** **Hydrocarbons** (derivatives of cyclohexane or of a cyclohexene { or of cyclohexadiene}, having a side-chain containing an acyclic unsaturated part of at least four carbon atoms, this part being directly attached to the cyclohexane or cyclohexene { or cyclohexadiene} rings [C07C 403/00](#); preparation of macromolecular compounds [C08](#); production or separation from undefined hydrocarbon mixtures such as petroleum oil [C10G](#); natural gas, synthetic natural gas, liquefied petroleum gas [C10L 3/00](#); electrolytic or electrophoretic processes [C25B](#))

**C07C 1/00**      **Preparation of hydrocarbons from one or more compounds, none of them being a hydrocarbon**

- C07C 1/02      .    from oxides of a carbon (preparation of liquid hydrocarbon mixtures of undefined composition [C10G 2/00](#); of synthetic natural gas [C10L 3/06](#))
- C07C 1/04      ..    from carbon monoxide with hydrogen
- C07C 1/0405      ...      {Apparatus}
- C07C 1/041      ....      {Reactors}
- C07C 1/0415      .....      {with moving catalysts}
- C07C 1/042      ....      {Temperature controlling devices; Heat exchangers}
- C07C 1/0425      ...      {Catalysts; their physical properties}
- C07C 1/043      ....      {characterised by the composition}
- C07C 1/0435      .....      {containing a metal of group 8 or a compound thereof}
- C07C 1/044      .....      {containing iron}
- C07C 1/0445      ....      {Preparation; Activation}
- C07C 1/045      ....      {Regeneration}
- C07C 1/0455      ...      {Reaction conditions}
- C07C 1/046      ....      {Numerical values of parameters (only to be used if no other subgroup of [C07C 1/04](#) is used)}
- C07C 1/0465      ....      {concerning fluidisation}
- C07C 1/047      ....      {Processes in which one or more parameters are changed during the process; Starting-up of the process}
- C07C 1/0475      ....      {Regulating}
- C07C 1/048      ....      {Temperature controlling measures}
- C07C 1/0485      ...      {Set-up of reactors or accessories; Multi-step processes}
- C07C 1/049      ....      {Coupling of the reaction and regeneration of the catalyst}
- C07C 1/0495      ...      {Non-catalytic processes; Catalytic processes in which there is also another way of activation, e.g. radiation}
- C07C 1/06      ...      in the presence of organic compounds, e.g. hydrocarbons {(multi-step processes in which the feed to a subsequent reaction zone comprises at least a part of the reaction-product of a previous reaction zone [C07C 1/0485](#))}
- C07C 1/063      ....      {the organic compound being the catalyst or a part of the catalyst system}
- C07C 1/066      .....      {used for dissolving, suspending or transporting the catalyst}
- C07C 1/08      ...      Isosyntheses
- C07C 1/10      ..    from carbon monoxide with water vapour

- C07C 1/12           ..     from carbon dioxide with hydrogen
- C07C 1/20           .     starting from organic compounds containing only oxygen atoms as heteroatoms
- C07C 1/207          ..     from carbonyl compounds
- C07C 1/2072         ...     {by condensation ([C07C 2/86](#) takes precedence)}
- C07C 1/2074         ....    {of only one compound}
- C07C 1/2076         ...     { by a transformation in which at least one -C(=O)- moiety is eliminated}
- C07C 1/2078         ...     { by a transformation in which at least one -C(=O)-O- moiety is eliminated}
- C07C 1/213          ...     by splitting of esters
- C07C 1/22           ..     by reduction
- C07C 1/24           ..     by elimination of water
- C07C 1/247          ..     by splitting of cyclic ethers
- C07C 1/26           .     starting from organic compounds containing only halogen atoms as hetero-atoms
- C07C 1/28           ..     by ring closure
- C07C 1/30           ..     by splitting-off the elements of hydrogen halide from a single molecule
- C07C 1/32           .     starting from compounds containing hetero-atoms other than or in addition to oxygen or halogen
- C07C 1/321          ..     {the hetero-atom being a non-metal atom}
- C07C 1/322          ...     {the hetero-atom being a sulfur atom}
- C07C 1/323          ...     {the hetero-atom being a nitrogen atom}
- C07C 1/324          ...     {the hetero-atom being a phosphorus atom ([C07C 1/34](#) takes precedence)}
- C07C 1/325          ..     {the hetero-atom being a metal atom}
- C07C 1/326          ...     {the hetero-atom being a magnesium atom}
- C07C 1/327          ...     {the hetero-atom being an aluminium atom ([C07C 2/88](#) takes precedence)}
- C07C 1/328          ...     {the hetero-atom being an alkali metal atom}
- C07C 1/34           ..     reacting phosphines with aldehydes or ketones, e.g. Wittig reaction
- C07C 1/36           .     by splitting of esters ([C07C 1/213](#), [C07C 1/30](#) take precedence)
- C07C 2/00**           **Preparation of hydrocarbons from hydrocarbons containing a smaller number of carbon atoms** ([redistribution reactions involving splitting C07C 6/00](#))
- C07C 2/02           .     by addition between unsaturated hydrocarbons
- C07C 2/04           ..     by oligomerisation of well-defined unsaturated hydrocarbons without ring formation
- C07C 2/06           ...     of alkenes, i.e. acyclic hydrocarbons having only one carbon-to-carbon double bond
- C07C 2/08           ....    Catalytic processes
- C07C 2/10           .....   with metal oxides
- C07C 2/12           .....   with crystalline aluminosilicates {or with catalysts comprising} molecular sieves
- C07C 2/14           .....   with inorganic acids; with salts or anhydrides of acids

C07C 2/16	.....	Acids of sulfur; Salts thereof; Sulfur oxides
C07C 2/18	.....	Acids of phosphorus; Salts thereof; Phosphorus oxides
C07C 2/20	.....	Acids of halogen; salts thereof {Complexes thereof with organic compounds}
C07C 2/22	.....	Metal halides; Complexes thereof with organic compounds
C07C 2/24	.....	with metals
C07C 2/26	.....	with hydrides or organic compounds (C07C 2/20 takes precedence)
C07C 2/28	.....	with ion-exchange resins
C07C 2/30	.....	containing metal-to-carbon bond; Metal hydrides
C07C 2/32	.....	as complexes, e.g. acetyl-acetonates {complexes of salts of acids of halogen C07C 2/20}
C07C 2/34	.....	Metal-hydrocarbon complexes
C07C 2/36	.....	as phosphines, arsines, stilbines or bismuthines
C07C 2/38	...	of dienes or alkynes
C07C 2/40	....	of conjugated dienes
C07C 2/403	.....	{Catalytic processes}
C07C 2/406	.....	{with hydrides or organic compounds}
C07C 2/42	..	homo- or co-oligomerisation with ring formation, not being a Diels-Alder conversion
C07C 2/44	...	of conjugated dienes only
C07C 2/46	....	Catalytic processes
C07C 2/465	.....	{with hydrides or organic compounds}
C07C 2/48	...	of only hydrocarbons containing a carbon-to-carbon triple bond
C07C 2/50	..	Diels-Alder conversion
C07C 2/52	...	Catalytic processes
C07C 2/54	.	by addition of unsaturated hydrocarbons to saturated hydrocarbons or to hydrocarbons containing a six-membered aromatic ring with no unsaturation outside the aromatic ring
C07C 2/56	..	Addition to acyclic hydrocarbons
C07C 2/58	...	Catalytic processes
C07C 2/60	....	with halides
C07C 2/62	....	with acids
C07C 2/64	..	Addition to a carbon atom of a six-membered aromatic ring
C07C 2/66	...	Catalytic processes
C07C 2/68	....	with halides
C07C 2/70	....	with acids
C07C 2/72	..	Addition to a non-aromatic carbon atom of hydrocarbons containing a six-membered aromatic ring
C07C 2/74	.	by addition with simultaneous hydrogenation
C07C 2/76	.	by condensation of hydrocarbons with partial elimination of hydrogen
C07C 2/78	..	Processes with partial combustion

- C07C 2/80 . . . Processes with the aid of electrical means
- C07C 2/82 . . . Oxidative coupling
- C07C 2/84 . . . . . catalytic
  
- C07C 2/86 . . by condensation between a hydrocarbon and a non-hydrocarbon
- C07C 2/861 . . . {the non-hydrocarbon contains only halogen as hetero-atoms}
- C07C 2/862 . . . {the non-hydrocarbon contains only oxygen as hetero-atoms}
- C07C 2/864 . . . . . {the non-hydrocarbon is an alcohol}
- C07C 2/865 . . . . . {the non-hydrocarbon is an ether}
- C07C 2/867 . . . . . {the non-hydrocarbon is an aldehyde or a ketone}
- C07C 2/868 . . . {the non-hydrocarbon contains sulfur as hetero-atom}
- C07C 2/88 . . { Growth and elimination reactions (preparation of metallo-organic compounds [C07F](#)) }
  
- C07C 4/00** **Preparation of hydrocarbons from hydrocarbons containing a larger number of carbon atoms** (redistribution reactions involving splitting [C07C 6/00](#); cracking hydrocarbon oils [C10G](#))
  
- C07C 4/02 . . by cracking a single hydrocarbon or a mixture of individually defined hydrocarbons or a normally gaseous hydrocarbon fraction
- C07C 4/025 . . . {Oxidative cracking, autothermal cracking or cracking by partial combustion}
- C07C 4/04 . . . Thermal processes {[C07C 4/025](#) takes precedence}
- C07C 4/06 . . . Catalytic processes {[C07C 4/025](#) takes precedence}
  
- C07C 4/08 . . by splitting-off an aliphatic or cycloaliphatic part from the molecule
- C07C 4/10 . . . from acyclic hydrocarbons
- C07C 4/12 . . . from hydrocarbons containing a six-membered aromatic ring, e.g. propyltoluene to vinyltoluene
- C07C 4/14 . . . . . splitting taking place at an aromatic-aliphatic bond
- C07C 4/16 . . . . . Thermal processes
- C07C 4/18 . . . . . Catalytic processes
- C07C 4/20 . . . . . Hydrogen being formed in situ, e.g. from steam
  
- C07C 4/22 . . by depolymerisation to the original monomer, e.g. dicyclopentadiene to cyclopentadiene
  
- C07C 4/24 . . by splitting polyarylsubstituted aliphatic compounds at an aliphatic-aliphatic bond, e.g. 1,4-diphenylbutane to styrene
  
- C07C 4/26 . . by splitting polyaryl compounds at a bond between uncondensed six-membered aromatic rings, e.g. biphenyl to benzene
  
- C07C 5/00** **Preparation of hydrocarbons from hydrocarbons containing the same number of carbon atoms**

- C07C 5/02 . by hydrogenation ([simultaneous hydrogenation and dehydrogenation C07C 5/52](#))
- C07C 5/03 .. of non-aromatic carbon-to-carbon double bonds
- C07C 5/05 ... Partial hydrogenation
- C07C 5/08 .. of carbon-to-carbon triple bonds
- C07C 5/09 ... to carbon-to-carbon double bonds
- C07C 5/10 .. of aromatic six-membered rings
- C07C 5/11 ... Partial hydrogenation
- C07C 5/13 .. with simultaneous isomerisation
  
- C07C 5/22 . by isomerisation ([with simultaneous hydrogenation C07C 5/13](#); [with simultaneous dehydrogenation C07C 5/373](#))
- C07C 5/2206 .. {Catalytic processes not covered by [C07C 5/23](#) to [C07C 5/31](#)}
- C07C 5/2213 ... {with metal oxides}
- C07C 5/222 ... {with crystalline aluminosilicates, e.g. molecular sieves}
- C07C 5/2226 ... {with inorganic acids; with salt or anhydrides of acids}
- C07C 5/2233 .... {Acids of sulfur; Salts thereof; Sulfur oxides}
- C07C 5/224 .... {Acids of phosphorus; Salts thereof; Phosphorus oxides}
- C07C 5/2246 .... {Acids of halogen; Salts thereof}
- C07C 5/2253 ..... {Metal halides; Complexes thereof with organic compounds}
- C07C 5/226 ... {with metals}
- C07C 5/2266 ... {with hydrides or organic compounds ([C07C 5/2246](#) takes precedence)}
- C07C 5/2273 .... {with ion-exchange resins}
- C07C 5/228 .... {containing metal-to-carbon bond; Metal hydrides}
- C07C 5/2286 .... {containing complexes, e.g. acetylacetonates ([complexes of salts of acids of halogen C07C 5/2246](#))}
- C07C 5/2293 .... {containing phosphines, arsines, stibines, or bismuthines}
- C07C 5/23 .. Rearrangement of carbon-to-carbon unsaturated bonds
- C07C 5/25 ... Migration of carbon-to-carbon double bonds
- C07C 5/2506 .... {Catalytic processes}
- C07C 5/2512 ..... {with metal oxides}
- C07C 5/2518 ..... {with crystalline aluminosilicates, e.g. molecular sieves}
- C07C 5/2525 ..... {with inorganic acids; with salts or anhydrides of acids}
- C07C 5/2531 ..... {Acids of sulfur; Salts thereof; Sulfur oxides}
- C07C 5/2537 ..... {Acids of phosphorus; Salts thereof; Phosphorus oxides}
- C07C 5/2543 ..... {Acids of halogen; Salts thereof}
- C07C 5/255 ..... {Metal halides; Complexes thereof with organic compounds}
- C07C 5/2556 ..... {with metals}
- C07C 5/2562 ..... {with hydrides or organic compounds ([C07C 5/2543](#) takes precedence)}
- C07C 5/2568 ..... {with ion-exchange resins}
- C07C 5/2575 ..... {containing metal-to-carbon bond; Metal hydrides}

C07C 5/2581	.....	{containing complexes e.g. acetyl-acetonates (complexes of salts of acids of halogen <a href="#">C07C 5/2543</a> )}
C07C 5/2587	.....	{Metal-hydrocarbon complexes}
C07C 5/2593	.....	{containing phosphines, arsines, stibines or bismuthines}
C07C 5/27	..	Rearrangement of carbon atoms in the hydrocarbon skeleton
C07C 5/2702	...	{Catalytic processes not covered by <a href="#">C07C 5/2732</a> to <a href="#">C07C 5/31</a> ; Catalytic processes covered by both <a href="#">C07C 5/2732</a> and <a href="#">C07C 5/277</a> simultaneously}
C07C 5/2705	....	{with metal oxides}
C07C 5/2708	....	{with crystalline alumino-silicates, e.g. molecular sieves}
C07C 5/271	....	{with inorganic acids; with salts or anhydrides of acids}
C07C 5/2713	.....	{Acids of sulfur; Salts thereof; Sulfur oxides}
C07C 5/2716	.....	{Acids of phosphorus; Salts thereof; Phosphorus oxides}
C07C 5/2718	.....	{Acids of halogen; Salts thereof; complexes thereof with organic compounds}
C07C 5/2721	.....	{Metal halides; Complexes thereof with organic compounds}
C07C 5/2724	....	{with metals}
C07C 5/2727	....	{with hydrides or organic compounds ( <a href="#">C07C 5/2718</a> takes precedence)}
C07C 5/2729	...	{Changing the branching point of an open chain or the point of substitution on a ring}
C07C 5/2732	....	{Catalytic processes}
C07C 5/2735	.....	{with metal oxides}
C07C 5/2737	.....	{with crystalline alumino-silicates, e.g. molecular sieves}
C07C 5/274	.....	{with inorganic acids; with salts or anhydrides of acids}
C07C 5/2743	.....	{Acids of sulfur; Salts thereof; Sulfur oxides}
C07C 5/2745	.....	{Acids of phosphorus; Salts thereof; Phosphorus acids}
C07C 5/2748	.....	{Acids of halogen; Salts thereof}
C07C 5/2751	.....	{Metal halides; Complexes thereof with organic compounds}
C07C 5/2754	.....	{with metals}
C07C 5/2756	.....	{with hydrides or organic compounds ( <a href="#">C07C 5/2748</a> takes precedence)}
C07C 5/2759	.....	{containing metal-to-carbon bond; Metal hydrides}
C07C 5/2762	.....	{containing complexes, e.g. acetyl-acetonates (complexes of salts of acids of halogen <a href="#">C07C 5/2748</a> )}
C07C 5/2764	.....	{Metal-hydrocarbon complexes}
C07C 5/2767	...	{Changing the number of side-chains}
C07C 5/277	....	{Catalytic processes}
C07C 5/2772	.....	{with metal oxides}
C07C 5/2775	.....	{with crystalline alumino-silicates, e.g. molecular sieves}
C07C 5/2778	.....	{with inorganic acids; with salts or anhydrides of acids}
C07C 5/2781	.....	{Acids of sulfur; Salts thereof; Sulfur oxides}
C07C 5/2783	.....	{Acids of phosphorus; Salts thereof; Phosphorus oxides}
C07C 5/2786	.....	{Acids of halogen; Salts thereof}

- C07C 5/2789 ..... {Metal halides; Complexes thereof with organic compounds}
- C07C 5/2791 ..... {with metals}
- C07C 5/2794 ..... {with hydrides or organic compounds (C07C 5/2786 takes precedence)}
- C07C 5/2797 ..... {with ion-exchange resins}
- C07C 5/29 ... changing the number of carbon atoms in a ring while maintaining the number of rings
- C07C 5/31 ... changing the number of rings
  
- C07C 5/32 . by dehydrogenation with formation of free hydrogen
- C07C 5/321 .. {Catalytic processes}
- C07C 5/322 ... {with metal oxides or metal sulfides}
- C07C 5/324 ... {with metals}
- C07C 5/325 ..... {of the platinum group}
- C07C 5/327 .. Formation of non-aromatic carbon-to-carbon double bonds only
- C07C 5/333 ... Catalytic processes
- C07C 5/3332 ..... {with metal oxides or metal sulfides}
- C07C 5/3335 ..... {with metals}
- C07C 5/3337 ..... {of the platinum group}
- C07C 5/35 .. Formation of carbon-to-carbon triple bonds only
- C07C 5/367 .. Formation of an aromatic six-membered ring from an existing six-membered ring, e.g. dehydrogenation of ethylcyclohexane to ethylbenzene
- C07C 5/373 .. with simultaneous isomerisation
- C07C 5/387 ... of cyclic compounds containing non six-membered ring to compounds containing a six-membered aromatic ring
- C07C 5/393 ... with cyclisation to an aromatic six-membered ring, e.g. dehydrogenation of n-hexane to benzene
- C07C 5/41 ..... Catalytic processes
- C07C 5/412 ..... {with metal oxides or metal sulfides}
- C07C 5/415 ..... {with metals}
- C07C 5/417 ..... {of the platinum group}
  
- C07C 5/42 . by dehydrogenation with a hydrogen acceptor

#### **NOTE**

The catalyst is considered as forming part of the acceptor system in case of simultaneous catalyst reduction.

The acceptor system is classified according to the supplying substances in case of in situ formation of the acceptor system or of in situ regeneration of the reduced acceptor system.

Compounds added for binding the reduced acceptor system are not considered as belonging to the acceptor system.

- C07C 5/44 .. with halogen or a halogen-containing compound as an acceptor

- C07C 5/46 . . with sulfur or a sulfur-containing compound as an acceptor
- C07C 5/48 . . with oxygen as an acceptor
- C07C 5/50 . . with an organic compound as an acceptor
- C07C 5/52 . . . with a hydrocarbon as an acceptor, e.g. hydrocarbon disproportionation, i.e.  $2\text{C}_n\text{H}_p \rightarrow \text{C}_n\text{H}_{p+q} + \text{C}_n\text{H}_{p-q}$
- C07C 5/54 . . with an acceptor system containing at least two compounds provided for in more than one of the sub-groups [C07C 5/44](#) to [C07C 5/50](#)
- C07C 5/56 . . . containing only oxygen and either halogens or halogen-containing compounds

**C07C 6/00 Preparation of hydrocarbons from hydrocarbons containing a different number of carbon atoms by redistribution reactions**

- C07C 6/02 . Metathesis reactions at an unsaturated carbon-to-carbon bond
- C07C 6/04 . . at a carbon-to-carbon double bond
- C07C 6/06 . . . at a cyclic carbon-to-carbon double bond
- C07C 6/08 . by conversion at a saturated carbon-to-carbon bond
- C07C 6/10 . . in hydrocarbons containing no six-membered aromatic rings
- C07C 6/12 . . of exclusively hydrocarbons containing a six-membered aromatic ring
- C07C 6/123 . . . {of only one hydrocarbon}
- C07C 6/126 . . . {of more than one hydrocarbon}

**C07C 7/00 Purification; Separation; Use of additives** (working-up undefined gaseous mixtures obtained by cracking hydrocarbon oils [C10G 70/00](#))

- C07C 7/005 . {Processes comprising at least two steps in series}
- C07C 7/04 . by distillation
- C07C 7/05 . . with the aid of auxiliary compounds
- C07C 7/06 . . . by azeotropic distillation
- C07C 7/08 . . . by extractive distillation
- C07C 7/09 . by fractional condensation
- C07C 7/10 . by extraction, i.e. purification or separation of liquid hydrocarbons with the aid of liquids
- C07C 7/11 . by absorption, i.e. purification or separation of gaseous hydrocarbons with the aid of liquids
- C07C 7/12 . by adsorption, i.e. purification or separation of hydrocarbons with the aid of solids, e.g. with ion-exchangers
- C07C 7/13 . . by molecular-sieve technique
- C07C 7/135 . by gas-chromatography

- C07C 7/14 . by crystallisation; Purification or separation of the crystals
- C07C 7/144 . using membranes, e.g. selective permeation
- C07C 7/148 . by treatment giving rise to a chemical modification of at least one compound

**NOTE**

In the following sub-groups contact masses and catalysts are disregarded for classification purposes

- C07C 7/14808 . . {with non-metals as element (hydrogenation [C07C 7/163](#))}
- C07C 7/14816 . . . {oxygen; ozone}
- C07C 7/14825 . . . {halogens}
- C07C 7/14833 . . {with metals or their inorganic compounds}
- C07C 7/14841 . . . {metals}
- C07C 7/1485 . . . {oxides; hydroxides; salts ([C07C 7/156](#) takes precedence)}
- C07C 7/14858 . . { with inorganic compounds not provided for before (acids, sulfur oxides [C07C 7/17](#))}
- C07C 7/14866 . . . {water (hydrate formation [C07C 7/152](#))}
- C07C 7/14875 . . {with organic compounds (organo-metallic compounds [C07C 7/173](#))}
- C07C 7/14883 . . . {hydrocarbons}
- C07C 7/14891 . . . {alcohols}
- C07C 7/152 . . by forming adducts or complexes
- C07C 7/156 . . . with solutions of copper salts
- C07C 7/163 . . by hydrogenation
- C07C 7/167 . . . for removal of compounds containing a triple carbon-to-carbon bond
- C07C 7/17 . . with acids or sulfur oxides
- C07C 7/171 . . . Sulfuric acid or oleum
- C07C 7/173 . . with the aid of organo-metallic compounds
- C07C 7/177 . . by selective oligomerisation or polymerisation of at least one compound of the mixture
- C07C 7/20 . use of additives, e.g. for stabilisation

**C07C 9/00****Aliphatic saturated hydrocarbons**

- C07C 9/02 . with one to four carbon atoms ([liquefied petroleum gas C10L 3/12](#))
- C07C 9/04 . . Methane ([production by treatment of sewage C02F 11/04](#); natural gas, synthetic natural gas [C10L 3/06](#))
- C07C 9/06 . . Ethane
- C07C 9/08 . . Propane
- C07C 9/10 . . with four carbon atoms

- C07C 9/12 . . . Iso-butane
- C07C 9/14 . with five to fifteen carbon atoms
- C07C 9/15 . . Straight-chain hydrocarbons
- C07C 9/16 . . Branched-chain hydrocarbons
- C07C 9/18 . . . with five carbon atoms
- C07C 9/21 . . . 2, 2, 4-Trimethylpentane
- C07C 9/22 . with more than fifteen carbon atoms

## **C07C 11/00 Aliphatic unsaturated hydrocarbons**

- C07C 11/02 . Alkenes
- C07C 11/04 . . Ethylene
- C07C 11/06 . . Propene
- C07C 11/08 . . with four carbon atoms
- C07C 11/09 . . . Isobutene
- C07C 11/10 . . with five carbon atoms
- C07C 11/107 . . with six carbon atoms
- C07C 11/113 . . . Methylpentenes
- C07C 11/12 . Alkadienes
- C07C 11/14 . . Allene
- C07C 11/16 . . with four carbon atoms
- C07C 11/167 . . . 1, 3-Butadiene
- C07C 11/173 . . with five carbon atoms
- C07C 11/18 . . . Isoprene
- C07C 11/20 . . . 1, 3-Pentadiene
- C07C 11/21 . Alkatrienes; Alkatetraenes; Other alkapolyenes
- C07C 11/22 . containing carbon-to-carbon triple bonds
- C07C 11/24 . . Acetylene ([production of acetylene gas by wet methods C10H](#))
- C07C 11/28 . containing carbon-to-carbon double bonds and carbon-to-carbon triple bonds
- C07C 11/30 . . Butenyne

## **C07C 13/00 Cyclic hydrocarbons containing rings other than, or in addition to, six-membered aromatic rings**

- C07C 13/02 . Monocyclic hydrocarbons or acyclic hydrocarbon derivatives thereof
- C07C 13/04 . . with a three-membered ring
- C07C 13/06 . . with a four-membered ring

C07C 13/08	..	with a five-membered ring
C07C 13/10	...	with a cyclopentane ring
C07C 13/11	....	substituted by unsaturated hydrocarbon groups
C07C 13/12	...	with a cyclopentene ring
C07C 13/15	...	with a cyclopentadiene ring
C07C 13/16	..	with a six-membered ring
C07C 13/18	...	with a cyclohexane ring
C07C 13/19	....	substituted by unsaturated hydrocarbon groups
C07C 13/20	...	with a cyclohexene ring
C07C 13/21	....	Menthadienes
C07C 13/23	...	with a cyclohexadiene ring
C07C 13/24	..	with a seven-membered ring
C07C 13/26	..	with an eight-membered ring
C07C 13/263	...	with a cyclo-octene or cyclo-octadiene ring
C07C 13/267	...	with a cyclo-octatriene or cyclo-octatetraene ring
C07C 13/271	..	with a nine- to ten- membered ring
C07C 13/273	..	with a twelve-membered ring
C07C 13/275	...	the twelve-membered ring being unsaturated
C07C 13/277	....	with a cyclododecatriene ring
C07C 13/28	.	Polycyclic hydrocarbons or acyclic hydrocarbon derivatives thereof

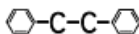
**NOTE**

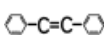

Ring systems consisting only of condensed six-membered ring with maximum number of non-cumulative double bonds are classified in group [C07C 15/00](#).

C07C 13/32	..	with condensed rings
C07C 13/34	...	with a bicyclo ring system containing four carbon atoms
C07C 13/36	...	with a bicyclo ring system containing five carbon atoms
C07C 13/38	...	with a bicyclo ring system containing six carbon atoms
C07C 13/39	...	with a bicyclo ring system containing seven carbon atoms
C07C 13/40	....	with a bicycloheptane ring structure
C07C 13/42	....	with a bicycloheptene ring structure
C07C 13/43	.....	substituted by unsaturated acyclic hydrocarbon
C07C 13/44	...	with a bicyclo ring system containing eight carbon atoms
C07C 13/45	...	with a bicyclo ring system containing nine carbon atoms
C07C 13/465	....	Indenes; Completely or partially hydrogenated indenenes
C07C 13/47	...	with a bicyclo ring system containing ten carbon atoms
C07C 13/48	....	Completely or partially hydrogenated naphthalenes
C07C 13/50	.....	Decahydronaphthalenes
C07C 13/52	....	Azulenenes; Completely or partially hydrogenated azulenes

C07C 13/54	...	with three condensed rings
C07C 13/547	....	at least one ring not being six-membered, the other rings being at the most six-membered
C07C 13/553	.....	with an indacene or hydrogenated indacene ring system
C07C 13/567	.....	with a fluorene or hydrogenated fluorene ring system
C07C 13/573	....	with three six-membered rings
C07C 13/58	.....	Completely or partially hydrogenated anthracenes
C07C 13/60	.....	Completely or partially hydrogenated phenanthrenes
C07C 13/605	....	with a bridged ring system
C07C 13/61	.....	with a bridged indene ring, e.g. dicyclopentadiene
C07C 13/615	.....	with an adamantane ring
C07C 13/62	...	with more than three condensed rings
C07C 13/64	....	with a bridged ring system
C07C 13/66	....	the condensed ring system contains only four rings
C07C 13/68	.....	with a bridged ring system
C07C 13/70	...	with a condensed ring system consisting of at least two, mutually uncondensed aromatic ring systems, linked by an annular structure formed by carbon chains on non-adjacent positions of the aromatic ring, e.g. cyclophanes
C07C 13/72	...	Spiro hydrocarbons

**C07C 15/00      Cyclic hydrocarbons containing only six-membered aromatic rings as cyclic parts**

C07C 15/02	.	Monocyclic hydrocarbons
C07C 15/04	..	Benzene
C07C 15/06	..	toluene
C07C 15/067	..	C <sub>8</sub> H <sub>10</sub> hydrocarbons
C07C 15/073	...	Ethylbenzene
C07C 15/08	...	Xylenes
C07C 15/085	..	Isopropylbenzene
C07C 15/107	..	having saturated side-chain containing at least six carbon atoms, e.g. detergent alkylates
C07C 15/113	...	having at least two saturated side-chains, each containing at least six carbon atoms
C07C 15/12	.	Polycyclic non-condensed hydrocarbons
C07C 15/14	..	all phenyl groups being directly linked
C07C 15/16	..	containing at least two phenyl groups linked by one single acyclic carbon atom
C07C 15/18	..	containing at least one group with formula 
C07C 15/20	.	Polycyclic condensed hydrocarbons
C07C 15/24	..	containing two rings
C07C 15/27	..	containing three rings

- C07C 15/28 . . . Anthracenes
- C07C 15/30 . . . Phenanthrenes
- C07C 15/38 . . containing four rings
- C07C 15/40 . substituted by unsaturated carbon radicals
- C07C 15/42 . . Monocyclic
- C07C 15/44 . . . the hydrocarbon substituent containing a carbon-to-carbon double bond
- C07C 15/46 . . . . Styrene; Ring-alkylated styrenes
- C07C 15/48 . . . the hydrocarbon substituent containing a carbon-to-carbon triple bond
- C07C 15/50 . . Polycyclic non-condensed
- C07C 15/52 . . . containing a group with formula 
- C07C 15/54 . . . containing a group with formula 
- C07C 15/56 . . Polycyclic condensed
- C07C 15/58 . . . containing two rings
- C07C 15/60 . . . containing three rings
- C07C 15/62 . . . containing four rings

**Guidance heading:** **Compounds containing carbon and halogens with or without hydrogen** (derivatives of cyclohexane or of a cyclohexene having an unsaturated side chain with at least four carbon atoms [C07C 403/00](#))

## **C07C 17/00 Preparation of halogenated hydrocarbons**

- C07C 17/007 . from carbon or from carbides and halogens
- C07C 17/013 . by addition of halogens
- C07C 17/02 . . to unsaturated hydrocarbons
- C07C 17/04 . . to unsaturated halogenated hydrocarbons
- C07C 17/06 . . combined with replacement of hydrogen atoms by halogens
- C07C 17/07 . by addition of hydrogen halides
- C07C 17/08 . . to unsaturated hydrocarbons
- C07C 17/087 . . to unsaturated halogenated hydrocarbons
- C07C 17/093 . by replacement by halogens
- C07C 17/10 . . of hydrogen atoms (combined with addition of halogens to unsaturated hydrocarbons [C07C 17/06](#))
- C07C 17/12 . . . in the ring of aromatic compounds
- C07C 17/14 . . . in the side-chain of aromatic compounds
- C07C 17/15 . . with oxygen as auxiliary reagent, e.g. oxychlorination
- C07C 17/152 . . . of hydrocarbons
- C07C 17/154 . . . . of saturated hydrocarbons

- C07C 17/156 . . . . of unsaturated hydrocarbons
- C07C 17/158 . . . of halogenated hydrocarbons
- C07C 17/16 . . of hydroxyl groups
- C07C 17/18 . . of oxygen atoms of carbonyl groups
- C07C 17/20 . . of halogen atoms by other halogen atoms
- C07C 17/202 . . . {two or more compounds being involved in the reaction}
- C07C 17/204 . . . . {the other compound being a halogen}
- C07C 17/206 . . . . {the other compound being HX}
- C07C 17/208 . . . . {the other compound being MX}
- C07C 17/21 . . . with simultaneous increase of the number of halogen atoms
  
- C07C 17/23 . by dehalogenation
  
- C07C 17/25 . by splitting-off hydrogen halides from halogenated hydrocarbons
  
- C07C 17/26 . by reactions involving an increase in the number of carbon atoms in the skeleton
- C07C 17/263 . . by condensation reactions
- C07C 17/2632 . . . { involving an organo-magnesium compound, e.g. Grignard synthesis}
- C07C 17/2635 . . . { involving a phosphorus compound, e.g. Wittig synthesis}
- C07C 17/2637 . . . { between a compound containing only oxygen and possibly halogen as hetero-atoms and a halogenated hydrocarbon}
  
- C07C 17/266 . . . of hydrocarbons and halogenated hydrocarbons
- C07C 17/269 . . . of only halogenated hydrocarbons
- C07C 17/272 . . by addition reactions
- C07C 17/275 . . . of hydrocarbons and halogenated hydrocarbons
- C07C 17/278 . . . of only halogenated hydrocarbons
- C07C 17/281 . . . . of only one compound
- C07C 17/30 . . by a Diels-Alder synthesis
- C07C 17/32 . . by introduction of halogenated alkyl groups into ring compounds
  
- C07C 17/35 . by reactions not affecting the number of carbon or of halogen atoms in the reaction
- C07C 17/354 . . by hydrogenation
- C07C 17/357 . . by dehydrogenation
- C07C 17/358 . . by isomerisation
  
- C07C 17/361 . by reactions involving a decrease in the number of carbon atoms
- C07C 17/363 . . by elimination of carboxyl groups
- C07C 17/367 . . by depolymerisation
  
- C07C 17/37 . by disproportionation of halogenated hydrocarbons
  
- C07C 17/38 . Separation; Purification; Stabilisation; Use of additives
- C07C 17/383 . . by distillation

- C07C 17/386 . . . with auxiliary compounds
- C07C 17/389 . . by adsorption on solids
- C07C 17/392 . . by crystallisation; Purification or separation of the crystals
- C07C 17/395 . . by treatment giving rise to a chemical modification of at least one compound
- C07C 17/42 . . Use of additives, e.g. for stabilisation

## **C07C 19/00 Acyclic saturated compounds containing halogen atoms**

- C07C 19/01 . containing chlorine
- C07C 19/03 . . Chloromethanes
- C07C 19/04 . . . Chloroform
- C07C 19/041 . . . Carbon tetrachloride
- C07C 19/043 . . Chloroethanes
- C07C 19/045 . . . Dichloroethanes
- C07C 19/05 . . . Trichloroethanes
- C07C 19/055 . . . Tetrachloroethanes
- C07C 19/07 . containing iodine
- C07C 19/075 . containing bromine
- C07C 19/08 . containing fluorine
- C07C 19/10 . . and chlorine
- C07C 19/12 . . . having two carbon atoms
- C07C 19/14 . . and bromine
- C07C 19/16 . . and iodine

## **C07C 21/00 Acyclic unsaturated compounds containing halogen atoms**

- C07C 21/02 . containing carbon-to-carbon double bonds
- C07C 21/04 . . Chloro-alkenes
- C07C 21/06 . . . Vinyl chloride
- C07C 21/067 . . . Allyl chloride; Methallyl chloride
- C07C 21/073 . . . Dichloro-alkenes
- C07C 21/08 . . . . Vinylidene chloride
- C07C 21/09 . . . . Dichloro-butenes
- C07C 21/10 . . . Trichloro-ethylene
- C07C 21/12 . . . Tetrachloro-ethylene
- C07C 21/14 . . containing bromine
- C07C 21/16 . . . Crotyl bromide
- C07C 21/17 . . containing iodine
- C07C 21/18 . . containing fluorine

- C07C 21/185 . . . tetrafluorethene
- C07C 21/19 . . Halogenated dienes
- C07C 21/20 . . . Halogenated butadienes
- C07C 21/21 . . . . Chloroprene
- C07C 21/215 . . Halogenated polyenes with more than two carbon-to-carbon double bonds
- C07C 21/22 . containing carbon-to-carbon triple bonds

## **C07C 22/00 Cyclic compounds containing halogen atoms bound to an acyclic carbon atom**

- C07C 22/02 . having unsaturation in the rings
- C07C 22/04 . . containing six-membered aromatic rings
- C07C 22/06 . . . Trichloromethylbenzene
- C07C 22/08 . . . containing fluorine

## **C07C 23/00 Compounds containing at least one halogen atom bound to a ring other than a six-membered aromatic ring**

- C07C 23/02 . Monocyclic halogenated hydrocarbons
- C07C 23/04 . . with a three-membered ring
- C07C 23/06 . . with a four-membered ring
- C07C 23/08 . . with a five-membered ring
- C07C 23/10 . . with a six-membered ring
- C07C 23/12 . . . Hexachlorocyclohexanes
- C07C 23/14 . . with a seven-membered ring
- C07C 23/16 . . with an eight-membered ring
- C07C 23/18 . Polycyclic halogenated hydrocarbons
- C07C 23/20 . . with condensed rings none of which is aromatic
- C07C 23/22 . . . with a bicyclo ring system containing four carbon atoms
- C07C 23/24 . . . with a bicyclo ring system containing five carbon atoms
- C07C 23/26 . . . with a bicyclo ring system containing six carbon atoms
- C07C 23/27 . . . with a bicyclo ring system containing seven carbon atoms
- C07C 23/28 . . . . Saturated bicyclo ring system
- C07C 23/30 . . . . Mono-unsaturated bicyclo ring system
- C07C 23/32 . . . with a bicyclo ring system containing eight carbon atoms
- C07C 23/34 . . . Halogenated completely or partially hydrogenated indenenes
- C07C 23/36 . . . Halogenated completely or partially hydrogenated naphthalenes
- C07C 23/38 . . . with three condensed rings
- C07C 23/40 . . . . Halogenated completely or partially hydrogenated fluorenes
- C07C 23/42 . . . . Halogenated completely or partially hydrogenated anthracenes

- C07C 23/44 . . . . Halogenated completely or partially hydrogenated phenanthrenes  
 C07C 23/46 . . . with more than three condensed rings

**C07C 25/00 Compounds containing at least one halogen atom bound to a six-membered aromatic ring**

- C07C 25/02 . Monocyclic aromatic halogenated hydrocarbons  
 C07C 25/06 . . Monochloro-benzene  
 C07C 25/08 . . Dichloro-benzenes  
 C07C 25/10 . . Trichloro-benzenes  
 C07C 25/12 . . Hexachloro-benzene  
 C07C 25/125 . . Halogenated xylenes  
 C07C 25/13 . . containing fluorine  
  
 C07C 25/18 . Polycyclic aromatic halogenated hydrocarbons  
 C07C 25/20 . . Dichloro-diphenyl-trichloro-ethane  
 C07C 25/22 . . with condensed rings  
  
 C07C 25/24 . Halogenated aromatic hydrocarbons with unsaturated side chains  
 C07C 25/28 . . Halogenated styrenes

**Guidance heading:** **Compounds containing carbon and oxygen, with or without hydrogen or halogens**  
 (irradiation products of cholesterol or its derivatives C07C 401/00; vitamin D derivatives, 9,10-seco cyclopenta[a]phenanthrene or analogues obtained by chemical preparation without irradiation C07C 401/00; derivatives of cyclohexane or of a cyclohexene { or of cyclohexadiene}, having a side-chain containing an acyclic unsaturated part of at least four carbon atoms, this part being directly attached to the cyclohexane or cyclohexene { or cyclohexadiene} rings C07C 403/00; prostaglandins or derivatives thereof C07C 405/00; peroxy compounds C07C 407/00, C07C 409/00)

**C07C 27/00 Processes involving the simultaneous production of more than one class of oxygen-containing compounds**

- C07C 27/04 . by reduction of oxygen-containing compounds (C07C 29/14 takes precedence)  
 C07C 27/06 . . by hydrogenation of oxides of carbon  
 C07C 27/08 . . . with moving catalysts  
  
 C07C 27/10 . by oxidation of hydrocarbons  
 C07C 27/12 . . with oxygen  
 C07C 27/14 . . . wholly gaseous reactions  
 C07C 27/16 . . with other oxidising agents  
  
 C07C 27/18 . by addition of alkynes to aldehydes, ketones, or alkylene oxides  
  
 C07C 27/20 . by oxo-reaction

- C07C 27/22 . . with the use of catalysts which are specific for this process
- C07C 27/24 . . with moving catalysts

- C07C 27/26 . Purification; Separation; Stabilisation
- C07C 27/28 . . by distillation
- C07C 27/30 . . . by azeotropic distillation
- C07C 27/32 . . . by extractive distillation
- C07C 27/34 . . by extraction

**C07C 29/00 Preparation of compounds having hydroxy or O-metal groups bound to a carbon atom not belonging to a six-membered aromatic ring**

- C07C 29/03 . by addition of hydroxy groups to unsaturated carbon-to-carbon bonds, e.g. with the aid of  $H_2O_2$  (by simultaneous introduction of -OH groups and halogens [C07C 29/64](#))
- C07C 29/04 . . by hydration of carbon-to-carbon double bonds
- C07C 29/05 . . . with formation of absorption products in mineral acids and their hydrolysis (characterised by the method of hydrolysis [C07C 29/12](#))
- C07C 29/06 . . . . the acid being sulfuric acid
- C07C 29/08 . . . . the acid being phosphoric acid
- C07C 29/09 . by hydrolysis
- C07C 29/095 . . {of esters of organic acids}
- C07C 29/10 . . of ethers, including cyclic ethers, e.g. oxiranes
- C07C 29/103 . . . {of cyclic ethers}
- C07C 29/106 . . . . {of oxiranes}
- C07C 29/12 . . of esters of mineral acids
- C07C 29/124 . . . of halides
- C07C 29/128 . by alcoholysis
- C07C 29/1285 . . {of esters of organic acids}
- C07C 29/132 . by reduction of an oxygen containing functional group
- C07C 29/136 . . of  $>C=O$  containing groups, e.g. -COOH
- C07C 29/14 . . . of a -CHO group
- C07C 29/141 . . . . with hydrogen or hydrogen-containing gases
- C07C 29/143 . . . of ketones
- C07C 29/145 . . . . with hydrogen or hydrogen-containing gases
- C07C 29/147 . . . of carboxylic acids or derivatives thereof
- C07C 29/149 . . . . with hydrogen or hydrogen-containing gases
- C07C 29/15 . by reduction of oxides of carbon exclusively
- C07C 29/151 . . with hydrogen or hydrogen-containing gases
- C07C 29/1512 . . . {characterised by reaction conditions}

- C07C 29/1514 . . . . {the solvents being characteristic}
- C07C 29/1516 . . . {Multisteps}
- C07C 29/1518 . . . . {one step being the formation of initial mixture of carbon oxides and hydrogen for synthesis}
- C07C 29/152 . . . characterised by the reactor used
- C07C 29/153 . . . characterised by the catalyst used
- C07C 29/154 . . . . containing copper, silver, gold, or compounds thereof
- C07C 29/156 . . . . containing iron group metals, platinum group metals or compounds thereof
- C07C 29/157 . . . . . containing platinum group metals or compounds thereof
- C07C 29/158 . . . . . containing rhodium or compounds thereof
- C07C 29/159 . . with reducing agents other than hydrogen or hydrogen-containing gases
  
- C07C 29/16 . by oxo-reaction combined with reduction
  
- C07C 29/17 . by hydrogenation of carbon-to-carbon double or triple bonds
- C07C 29/172 . . {with the obtention of a fully saturated alcohol}
- C07C 29/175 . . {with simultaneous reduction of an oxo group}
- C07C 29/177 . . {with simultaneous reduction of a carboxy group}
- C07C 29/19 . . in six-membered aromatic rings
- C07C 29/20 . . . in a non-condensed ring substituted with hydroxy groups
  
- C07C 29/32 . increasing the number of carbon atoms by reactions without formation of -OH groups
- C07C 29/34 . . by condensation involving hydroxy groups or the mineral ester groups derived therefrom, e.g. Guerbet reaction
  
- C07C 29/36 . increasing the number of carbon atoms by reactions with formation of hydroxy groups, which may occur via intermediates being derivatives of hydroxy, e.g. O-metal
- C07C 29/38 . . by reaction with aldehydes or ketones
- C07C 29/40 . . . with compounds containing carbon-to-metal bonds
- C07C 29/42 . . . with compounds containing triple carbon-to-carbon bonds, e.g. with metal-alkynes
  
- C07C 29/44 . increasing the number of carbon atoms by addition reactions, i.e. reactions involving at least one carbon-to-carbon double or triple bond (C07C 29/16 takes precedence)
- C07C 29/46 . . by diene-synthesis
  
- C07C 29/48 . by oxidation reactions with formation of hydroxy groups
- C07C 29/50 . . with molecular oxygen only
- C07C 29/52 . . . in the presence of mineral boron compounds with, when necessary, hydrolysis of the intermediate formed
- C07C 29/54 . . . starting from compounds containing carbon-to-metal bonds and followed by conversion of the -O- metal to -OH groups
  
- C07C 29/56 . by isomerisation

- C07C 29/58 . by elimination of halogen, e.g. by hydrogenolysis, splitting-off ([C07C 29/124 takes precedence](#))
- C07C 29/60 . by elimination of -OH groups, e.g. by dehydration ([C07C 29/34 takes precedence](#))
- C07C 29/62 . by introduction of halogen; by substitution of halogen atoms by other halogen atoms
- C07C 29/64 . by simultaneous introduction of -OH groups and halogens
- C07C 29/66 . . by addition of hypohalogenous acids, which may be formed in situ, to carbon-to-carbon unsaturated bonds
- C07C 29/68 . Preparation of metal alcoholates ([C07C 29/42](#), [C07C 29/54 take precedence](#))
- C07C 29/685 . . {by converting O-metal groups to other O-metal groups}
- C07C 29/70 . . by converting hydroxy groups to O-metal groups {[C07C 29/09 takes precedence](#)}
- C07C 29/705 . . . {by transalcoholysis (for the same reaction with the emphasis on alcohol preparation see [C07C 29/128](#))}
- C07C 29/72 . . by oxidation of carbon-to-metal bonds
- C07C 29/74 . Separation; purification; use of additives, e.g. for stabilisation
- C07C 29/76 . . by physical treatment
- C07C 29/78 . . . by condensation or crystallisation
- C07C 29/80 . . . by distillation
- C07C 29/82 . . . . by azeotropic distillation
- C07C 29/84 . . . . by extractive distillation
- C07C 29/86 . . . by liquid-liquid treatment
- C07C 29/88 . . by treatment giving rise to a chemical modification of at least one compound ([chemisorption C07C 29/76](#))
- C07C 29/90 . . . using hydrogen only
- C07C 29/92 . . . by a consecutive conversion and reconstruction
- C07C 29/94 . . Use of additives, e.g. for stabilisation
- 
- C07C 31/00 Saturated compounds having hydroxy or O-metal groups bound to acyclic carbon atoms**
- C07C 31/02 . Monohydroxylic acyclic alcohols
- C07C 31/04 . . Methanol
- C07C 31/08 . . Ethanol
- C07C 31/10 . . containing three carbon atoms
- C07C 31/12 . . containing four carbon atoms
- C07C 31/125 . . containing five to twenty-two carbon atoms
- C07C 31/13 . Monohydroxylic alcohols containing saturated rings
- C07C 31/133 . . Monocyclic

- C07C 31/1333 ... {with a three-membered ring}
- C07C 31/1336 ... {with a four-membered ring}
- C07C 31/135 ... with a five or six-membered ring; naphthenic alcohols
- C07C 31/1355 .... {with a six-membered ring}
- C07C 31/137 .. Polycyclic with condensed ring systems
  
- C07C 31/18 . Polyhydroxylic acyclic alcohols
- C07C 31/20 .. Dihydroxylic alcohols
- C07C 31/202 ... { Ethylene glycol}
- C07C 31/205 ... { 1,3-Propanediol; 1,2-Propanediol}
- C07C 31/207 ... { 1,4-Butanediol; 1,3-Butanediol; 1,2-Butanediol; 2,3-Butanediol}
- C07C 31/22 .. Trihydroxylic alcohols, e.g. glycerol
- C07C 31/225 ... {Glycerol}
- C07C 31/24 .. Tetrahydroxylic alcohols, e.g. pentaerythritol
- C07C 31/245 ... {Pentaerythritol}
- C07C 31/26 .. Hexahydroxylic alcohols
  
- C07C 31/27 . Polyhydroxylic alcohols containing saturated rings
- C07C 31/272 .. {Monocyclic}
- C07C 31/274 ... {with a three to five-membered ring}
- C07C 31/276 ... {with a six-membered ring}
- C07C 31/278 .. {Polycyclic with condensed rings}
  
- C07C 31/28 . Metal alcoholates (titanates, zirconates [C07F 7/00](#))
- C07C 31/30 .. Alkali metal or alkaline earth metal alcoholates
- C07C 31/32 .. Aluminium alcoholates
  
- C07C 31/34 . Halogenated alcohols
- C07C 31/36 .. the halogen not being fluorine
- C07C 31/38 .. containing only fluorine as halogen
- C07C 31/40 .. Perhalogenated
- C07C 31/42 .. Polyhydroxylic acyclic alcohols
- C07C 31/44 .. Halogenated alcohols containing saturated rings

**C07C 33/00      Unsaturated compounds having hydroxy or O-metal groups bound to acyclic carbon atoms**

**NOTE**

In condensed ring systems of six-membered aromatic rings and other rings, the double bond belonging to a benzene ring is not considered as unsaturated for the non-aromatic ring condensed thereon, e.g. the 1, 2, 3, 4-tetrahydronaphtalene ring is considered to be saturated outside the aromatic ring

- C07C 33/02 . Acyclic alcohols with carbon-to-carbon double bonds
- C07C 33/025 .. with only one double bond
- C07C 33/03 ... in beta-position, e.g. allyl alcohol, methallyl alcohol
- C07C 33/035 ... Alkenediols
- C07C 33/04 . Acyclic alcohols with carbon-to-carbon triple bonds
- C07C 33/042 .. with only one triple bond
- C07C 33/044 ... Alkynediols
- C07C 33/046 .... Butynediols
- C07C 33/048 .. with double and triple bonds
- C07C 33/05 . Alcohols containing rings other than six-membered aromatic rings
- C07C 33/12 .. containing five-membered rings
- C07C 33/14 .. containing six-membered rings
- C07C 33/16 .. containing rings with more than six ring members
- C07C 33/18 . Monohydroxylic alcohols containing only six-membered aromatic rings as cyclic part
- C07C 33/20 .. Monocyclic
- C07C 33/22 ... Benzylalcohol; phenethyl alcohol
- C07C 33/24 .. Polycyclic without condensed ring systems
- C07C 33/26 . Polyhydroxylic alcohols containing only six-membered aromatic rings as cyclic part
- C07C 33/28 . Alcohols containing only six-membered aromatic rings as cyclic part with unsaturation outside the aromatic rings
- C07C 33/30 .. Monocyclic
- C07C 33/32 ... Cinnamyl alcohol
- C07C 33/34 . Monohydroxylic alcohols containing six-membered aromatic rings and other rings
- C07C 33/36 . Polyhydroxylic alcohols containing six-membered aromatic rings and other rings
- C07C 33/38 . Alcohols containing six-membered aromatic rings and other rings and having unsaturation outside the aromatic rings
- C07C 33/40 . Halogenated unsaturated alcohols
- C07C 33/42 .. Acyclic
- C07C 33/423 ... {containing only double bonds as unsaturation}
- C07C 33/426 ... {containing only triple bonds as unsaturation}
- C07C 33/44 .. containing rings other than six-membered aromatic rings
- C07C 33/46 .. containing only six-membered aromatic rings as cyclic parts
- C07C 33/48 ... with unsaturation outside the aromatic rings
- C07C 33/483 .... {Monocyclic}
- C07C 33/486 .... {Polycyclic}

- C07C 33/50      ..      containing six-membered aromatic rings and other rings
  
- C07C 35/00      **Compounds having at least one hydroxy or O-metal group bound to a carbon atom of a ring other than a six-membered aromatic ring****
  
- C07C 35/02      .      Monocyclic
- C07C 35/04      ..      containing a three or four-membered ring
- C07C 35/045      ...      {containing a four-membered ring}
- C07C 35/06      ..      containing a five-membered ring
- C07C 35/08      ..      containing a six-membered ring
- C07C 35/12      ...      Menthol
- C07C 35/14      ...      with more than one hydroxy group bound to the ring
- C07C 35/16      ....      Inositols
- C07C 35/17      ...      with unsaturation only outside the ring
- C07C 35/18      ...      with unsaturation at least in the ring
- C07C 35/20      ..      containing a seven or eight-membered ring
- C07C 35/205      ..      containing a nine to twelve-membered ring, e.g. cyclododecanols
  
- C07C 35/21      .      polycyclic, at least one hydroxy group bound to a non-condensed ring
  
- C07C 35/22      .      polycyclic, at least one hydroxy group bound to a condensed ring system
- C07C 35/23      ..      with hydroxy on a condensed ring system having two rings
- C07C 35/24      ...      the condensed ring system containing five carbon atoms
- C07C 35/26      ....      bicyclopentadienols
- C07C 35/27      ...      the condensed ring system containing six carbon atoms
- C07C 35/28      ...      the condensed ring system containing seven carbon atoms
- C07C 35/29      ....      being a (2.2.1) system
- C07C 35/30      .....      Borneol; Isoborneol
- C07C 35/31      ...      the condensed ring system containing eight carbon atoms
- C07C 35/32      ...      the condensed ring system being a (4.3.0) system, e.g. indenols
- C07C 35/34      ...      the condensed ring system being a (5.3.0.) system, e.g. azulenols
- C07C 35/36      ...      the condensed ring system being a (4.4.0) system, e.g. naphols
- C07C 35/37      ..      with a hydroxy group on a condensed system having three rings
- C07C 35/38      ...      derived from the fluorene skeleton
- C07C 35/40      ...      derived from the anthracene skeleton
- C07C 35/42      ...      derived from the phenanthrene skeleton
- C07C 35/44      ..      with a hydroxy group on a condensed ring system having more than three rings
  
- C07C 35/46      .      O-metal derivatives of the cyclically bound hydroxy groups
  
- C07C 35/48      .      Halogenated derivatives
- C07C 35/50      ..      Alcohols with at least two rings

- C07C 35/52 . . Alcohols with a condensed ring system
- C07C 37/00** **Preparation of compounds having hydroxy or O-metal groups bound to a carbon atom of a six-membered aromatic ring**
  - C07C 37/001 . {by modification in a side chain}
  - C07C 37/002 . . {by transformation of a functional group, e.g. oxo, carboxyl}
  - C07C 37/003 . . {by hydrogenation of an unsaturated part}
  - C07C 37/004 . {by obtaining phenols from plant material or from animal material}
  - C07C 37/005 . {by obtaining phenols from products, waste products or side-products of processes, not directed to the production of phenols, by conversion or working-up}
  - C07C 37/006 . . {from the petroleum industry}
  - C07C 37/007 . . {from the tar industry}
  - C07C 37/008 . . {from coke ovens}
  - C07C 37/009 . . {from waste water (treatment of waste water [C02F](#))}
  - C07C 37/01 . by replacing functional groups bound to a six-membered aromatic ring by hydroxy groups, e.g. by hydrolysis
  - C07C 37/02 . . by substitution of halogen
  - C07C 37/04 . . by substitution of SO<sub>3</sub>H groups or a derivative thereof
  - C07C 37/045 . . by substitution of a group bound to the ring by nitrogen
  - C07C 37/05 . . . by substitution of a NH<sub>2</sub> group
  - C07C 37/055 . . the substituted group being bound to oxygen, e.g. ether group
  - C07C 37/0555 . . . {being esterified hydroxy groups}
  - C07C 37/06 . by conversion of non-aromatic six-membered rings or of such rings formed in situ into aromatic six-membered rings, e.g. by dehydrogenation
  - C07C 37/07 . . with simultaneous reduction of C=O group in that ring
  - C07C 37/08 . by decomposition of hydroperoxides, e.g. cumene hydroperoxide
  - C07C 37/11 . by reaction increasing the number of carbon atoms
  - C07C 37/115 . . {using acetals}
  - C07C 37/14 . . by addition reactions, i.e. reactions involving at least one carbon-to-carbon unsaturated bond
  - C07C 37/16 . . by condensation involving hydroxy groups of phenols or alcohols or the ether or mineral ester group derived therefrom
  - C07C 37/18 . . by condensation involving halogen atoms of halogenated compounds
  - C07C 37/20 . . using aldehydes or ketones
  - C07C 37/48 . by exchange of hydrocarbon groups, which may be substituted, from the same of other compounds, e.g. transalkylation

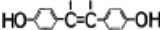
- C07C 37/50 . by reactions decreasing the number of carbon atoms ([C07C 37/04](#), [C07C 37/045](#), [C07C 37/055](#), [C07C 37/08](#) take precedence)
- C07C 37/52 . . by splitting polyaromatic compounds, e.g. polyphenolalkanes
- C07C 37/54 . . . by hydrolysis of lignin or sulfite waste liquor
- C07C 37/56 . . by replacing a carboxyl or aldehyde group by a hydroxy group
- C07C 37/58 . by oxidation reactions introducing directly hydroxy groups on a =CH-group belonging to a six-membered aromatic ring with the aid of molecular oxygen
- C07C 37/60 . by oxidation reactions introducing directly hydroxy groups on a =CH-group belonging to a six-membered aromatic ring with the aid of other oxidants than molecular oxygen or their mixtures with molecular oxygen
- C07C 37/62 . by introduction of halogen; by substitution of halogen atoms by other halogen atoms
- C07C 37/64 . Preparation of O-metal compounds with O-metal group bound to a carbon atom belonging to a six-membered aromatic ring
- C07C 37/66 . . by conversion of hydroxy groups to O-metal groups
- C07C 37/68 . Purification; separation; Use of additives, e.g. for stabilisation {([C07C 37/004](#) and [C07C 37/005](#) take precedence)}
- C07C 37/685 . . {Processes comprising at least two steps in series}
- C07C 37/70 . . by physical treatment
- C07C 37/72 . . . by liquid-liquid treatment
- C07C 37/74 . . . by distillation
- C07C 37/76 . . . . by steam distillation
- C07C 37/78 . . . . by azeotropic distillation
- C07C 37/80 . . . . by extractive distillation
- C07C 37/82 . . . by solid-liquid treatment; by chemisorption
- C07C 37/84 . . . by crystallisation
- C07C 37/86 . . by treatment giving rise to a chemical modification ([chemisorption C07C 37/82](#))
- C07C 37/88 . . Use of additives, e.g. for stabilisation

**C07C 39/00 Compounds having at least one hydroxy or O-metal group bound to a carbon atom of a six-membered aromatic ring**

**NOTE**

In condensed ring systems of six-membered aromatic rings and other rings, the double bond belonging to the benzene ring is not considered as unsaturated for the non-aromatic ring condensed thereon.

- C07C 39/02 . monocyclic with no unsaturation outside the aromatic ring
- C07C 39/04 . . Phenol
- C07C 39/06 . . Alkylated phenols

- C07C 39/07 . . . containing only methyl groups, e.g. cresols, xyenols
- C07C 39/08 . . Dihydroxy benzenes; alkylated derivatives thereof
- C07C 39/10 . . Polyhydroxy benzenes; alkylated derivatives thereof ([C07C 39/08 takes precedence](#))
- C07C 39/11 . . alkylated hydroxy benzenes containing also acyclically bound hydroxy groups, e.g. saligenol
  
- C07C 39/12 . polycyclic with no unsaturation outside the aromatic rings
- C07C 39/14 . . with at least one hydroxy group on a condensed ring system containing two rings
- C07C 39/15 . . with all hydroxy groups on non-condensed rings, {e.g. phenylphenol}
- C07C 39/16 . . . Bis-(hydroxyphenyl) alkanes; Tris-(hydroxyphenyl)alkanes
- C07C 39/17 . . containing other rings in addition to the six-membered aromatic rings, {e.g. cyclohexylphenol}
  
- C07C 39/18 . monocyclic with unsaturation outside the aromatic ring
- C07C 39/19 . . containing carbon-to-carbon double bonds but no carbon-to-carbon triple bonds
- C07C 39/20 . . . Hydroxy-styrenes
  
- C07C 39/205 . polycyclic, containing only six-membered aromatic rings as cyclic parts with unsaturation outside the rings
- C07C 39/21 . . with at least one hydroxy group on a non-condensed ring
- C07C 39/215 . . . containing , e.g. diethylstilbestrol
- C07C 39/225 . . with at least one hydroxy group on a condensed ring system
  
- C07C 39/23 . polycyclic, containing six-membered aromatic rings and other rings, with unsaturation outside the aromatic rings
  
- C07C 39/235 . Metal derivatives of a hydroxy group bound to a six-membered aromatic ring
  
- C07C 39/24 . Halogenated derivatives
- C07C 39/245 . . {monocyclic polyhydroxylic containing halogens bound to ring carbon atoms}
- C07C 39/26 . . monocyclic monohydroxylic containing halogen bound to ring carbon atoms
- C07C 39/27 . . . all halogen atoms being bound to ring carbon atoms
- C07C 39/28 . . . . the halogen being one chlorine atom
- C07C 39/30 . . . . the halogen being two chlorine atoms
- C07C 39/32 . . . . the halogen being three chlorine atoms
- C07C 39/34 . . . . the halogen being four chlorine atoms
- C07C 39/36 . . . . Pentachlorophenol
- C07C 39/367 . . polycyclic non-condensed, containing only six-membered aromatic rings as cyclic parts e.g. halogenated poly-hydroxyphenylalkanes
- C07C 39/373 . . with all hydroxy groups on non-condensed rings and with unsaturation outside the aromatic rings
- C07C 39/38 . . with at least one hydroxy group on a condensed ring system containing two rings

- C07C 39/40 . . with at least one hydroxy group on a condensed ring system containing more than two rings
- C07C 39/42 . . containing six-membered aromatic rings and other rings
- C07C 39/44 . . Metal derivatives of an hydroxy group bound to a carbon atom of a six-membered aromatic ring

**C07C 41/00 Preparation of ethers; Preparation of compounds having  $\text{>C}(\text{O}^-)\text{O}^-$  groups,**



groups or



groups

- C07C 41/01 . Preparation of ethers
- C07C 41/02 . . from oxiranes
- C07C 41/03 . . . by reaction of oxirane rings with hydroxy groups
- C07C 41/05 . . by addition of compounds to unsaturated compounds
- C07C 41/06 . . . by addition of organic compounds only
- C07C 41/08 . . . . to carbon-to-carbon triple bonds
- C07C 41/09 . . by dehydration of compounds containing hydroxy groups
- C07C 41/14 . . by exchange of organic parts on the ether-oxygen for other organic parts, e.g. by trans-etherification
- C07C 41/16 . . by reaction of esters of mineral or organic acids with hydroxy or O-metal groups
- C07C 41/18 . . by reactions not forming ether-oxygen bonds
- C07C 41/20 . . . by hydrogenation of carbon-to-carbon double or triple bonds
- C07C 41/22 . . . by introduction of halogens; by substitution of halogen atoms by other halogen atoms
- C07C 41/24 . . . by elimination of halogens, e.g. elimination of HCl
- C07C 41/26 . . . by introduction of hydroxy or O-metal groups
- C07C 41/28 . . . from acetals, e.g. by dealcoholysis
- C07C 41/30 . . . by increasing the number of carbon atoms, e.g. by oligomerisation
- C07C 41/32 . . by isomerisation
- C07C 41/34 . . Separation; Purification; Stabilisation; Use of additives
- C07C 41/36 . . . by solid-liquid treatment; by chemisorption
- C07C 41/38 . . . by liquid-liquid treatment
- C07C 41/40 . . . by change of physical state, e.g. by crystallisation
- C07C 41/42 . . . . by distillation
- C07C 41/44 . . . by treatments giving rise to a chemical modification (by chemisorption [C07C 41/36](#))
- C07C 41/46 . . . Use of additives, e.g. for stabilisation
- C07C 41/48 . Preparation of compounds having  $\text{>C}(\text{O}^-)\text{O}^-$  group
- C07C 41/50 . . by reactions producing  $\text{>C}(\text{O}^-)\text{O}^-$  groups
- C07C 41/52 . . . by substitution of halogen only

- C07C 41/54 ... by addition of compounds to unsaturated carbon-to-carbon bonds
- C07C 41/56 ... by condensation of aldehydes, paraformaldehyde, or ketones
- C07C 41/58 .. Separation; Purification; Stabilisation; Use of additives
- C07C 41/60 . Preparation of compounds having



groups or



groups

**C07C 43/00****Ethers; Compounds having****groups,****groups or****groups**

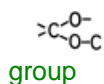
- C07C 43/02 . Ethers
- C07C 43/03 .. having all ether-oxygen atoms bound to acyclic carbon atoms
- C07C 43/04 ... Saturated ethers
- C07C 43/043 .... { Dimethyl ether}
- C07C 43/046 .... { Alkyl tert-alkyl ether, e.g. CH<sub>3</sub>OC(CH<sub>3</sub>)<sub>3</sub>}
- C07C 43/06 .... Diethyl ether
- C07C 43/10 .... of polyhydroxy compounds
- C07C 43/11 ..... Polyethers containing -O-(C-C-O)<sub>n</sub> units with  $\leq 2 \leq 10$
- C07C 43/115 .... containing carbocyclic rings
- C07C 43/12 .... containing halogen
- C07C 43/123 ..... {both carbon chains are substituted by halogen atoms}
- C07C 43/126 ..... { having more than one ether bond}
- C07C 43/13 .... containing hydroxy or O-metal groups (C07C 43/11 takes precedence)
- C07C 43/132 ..... {both carbon chains being substituted by hydroxy or O-metal groups}
- C07C 43/135 ..... { having more than one ether bond}
- C07C 43/137 ..... {containing halogen}
- C07C 43/14 ... Unsaturated ethers
- C07C 43/15 .... containing only non-aromatic carbon-to-carbon double bonds
- C07C 43/16 ..... Vinyl ethers
- C07C 43/162 .... containing rings other than six-membered aromatic rings
- C07C 43/164 .... containing six-membered aromatic rings
- C07C 43/166 ..... having unsaturation outside the aromatic rings
- C07C 43/168 ..... containing six-membered aromatic rings and other rings
- C07C 43/17 .... containing halogen
- C07C 43/172 ..... containing rings other than six-membered aromatic rings
- C07C 43/174 ..... containing six-membered aromatic rings
- C07C 43/1742 ..... {with halogen atoms bound to the aromatic rings}
- C07C 43/1745 ..... {having more than one ether bond}
- C07C 43/1747 ..... {containing six membered aromatic rings and other rings}

C07C 43/176	.....	having unsaturation outside the aromatic rings
C07C 43/178	....	containing hydroxy or O-metal groups
C07C 43/1781	.....	{containing rings other than six-membered aromatic rings}
C07C 43/1782	.....	{containing six-membered aromatic rings}
C07C 43/1783	.....	{with hydroxy or -O-metal groups bound to the aromatic rings}
C07C 43/1785	.....	{having more than one ether bound}
C07C 43/1786	.....	{containing halogen}
C07C 43/1787	.....	{ containing six-membered aromatic rings and having unsaturation outside the aromatic rings}
C07C 43/1788	.....	{containing six-membered aromatic rings and other rings}
C07C 43/18	..	having an ether-oxygen atom bound to a carbon atom of a ring other than a six-membered aromatic ring
C07C 43/184	...	to a carbon atom of a non-condensed ring
C07C 43/188	...	Unsaturated ethers
C07C 43/192	...	containing halogen
C07C 43/196	...	containing hydroxy or O-metal groups
C07C 43/20	..	having an ether-oxygen atom bound to a carbon atom of a six-membered aromatic ring
C07C 43/202	...	{the aromatic ring being a naphthalene}
C07C 43/205	...	the aromatic ring being a non-condensed ring
C07C 43/2055	.....	{ containing more than one ether bond}
C07C 43/21	...	containing rings other than six-membered aromatic rings
C07C 43/215	...	having unsaturation outside the six-membered aromatic ring
C07C 43/225	...	containing halogen
C07C 43/23	...	containing hydroxy or O-metal groups
C07C 43/235	..	having an ether-oxygen atom bound to a carbon atom of a six-membered aromatic ring and to a carbon atom of a ring other than a six-membered aromatic ring
C07C 43/243	...	having unsaturation outside the six-membered aromatic rings
C07C 43/247	...	containing halogen
C07C 43/253	...	containing hydroxy or O-metal groups
C07C 43/257	..	having an ether-oxygen atom bound to carbon atoms both belonging to six-membered aromatic rings
C07C 43/263	...	the aromatic rings being non-condensed
C07C 43/267	...	containing other rings
C07C 43/275	...	having all ether-oxygen atoms bound to carbon atoms of six-membered aromatic rings
C07C 43/285	...	having unsaturation outside the six-membered aromatic rings
C07C 43/29	...	containing halogen
C07C 43/295	...	containing hydroxy or O-metal groups

- C07C 43/30 . Compounds having  $\begin{array}{c} \text{O}^- \\ | \\ >\text{C}-\text{O}-\text{C} \end{array}$  groups

**NOTE**

The acetal carbon atom is the carbon atom of the



- C07C 43/303 . . having acetal carbon atoms bound to acyclic carbon atoms
- C07C 43/305 . . having acetal carbon atoms as rings members or bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 43/307 . . having acetal carbon atoms bound to carbon atoms of six-membered aromatic rings
- C07C 43/313 . . containing halogen
- C07C 43/315 . . containing oxygen atoms singly bound to carbon atoms not being acetal carbon atoms
- C07C 43/317 . . having  $\begin{array}{c} \text{O}^- \\ | \\ >\text{C}-\text{O}-\text{X} \end{array}$  groups, X being hydrogen or metal
- C07C 43/32 . Compounds having  $\begin{array}{c} \text{O}^- \\ | \\ -\text{C}-\text{O}-\text{C} \\ | \\ \text{O}-\text{C} \end{array}$  groups or  $\begin{array}{c} \text{O}^- \\ | \\ \text{C}-\text{O}-\text{C} \\ | \\ \text{O}-\text{C} \end{array}$  groups

**C07C 45/00 Preparation of compounds having  $>\text{C} = \text{O}$  groups bound only to carbon or hydrogen atoms; Preparation of chelates of such compounds**

- C07C 45/002 . {by dehydrogenation}
- C07C 45/004 . {by reaction with organometalhalides}
- C07C 45/006 . {by hydrogenation of aromatic hydroxy compounds}
- C07C 45/008 . {by reaction with tri- or tetrahalomethyl compounds}
- C07C 45/26 . by hydration of carbon-to-carbon triple bonds
- C07C 45/27 . by oxidation (with ozone [C07C 45/40](#))
- C07C 45/28 . . of  $\text{CH}_x$ -moieties
- C07C 45/29 . . of hydroxy groups
- C07C 45/292 . . . {with chromium derivatives}
- C07C 45/294 . . . {with hydrogen peroxide}
- C07C 45/296 . . . {with lead derivatives}
- C07C 45/298 . . . {with manganese derivatives}
- C07C 45/30 . . with halogen containing compounds, e.g. hypohalogenation
- C07C 45/305 . . . {with halogenochromate reagents, e.g. pyridinium chlorochromate}

- C07C 45/31 . . with compounds containing mercury atoms, which may be regenerated in situ, e.g. by oxygen
- C07C 45/32 . . with molecular oxygen
- C07C 45/33 . . . of CH<sub>x</sub>-moieties
- C07C 45/34 . . . . in unsaturated compounds
- C07C 45/35 . . . . . in propene or isobutene
- C07C 45/36 . . . . . in compounds containing six-membered aromatic rings
- C07C 45/37 . . . of C-O-functional groups to >C=O groups
- C07C 45/38 . . . . being a primary hydroxyl group
- C07C 45/39 . . . . being a secondary hydroxyl group
  
- C07C 45/40 . by oxidation with ozone; by ozonolysis
  
- C07C 45/41 . by hydrogenolysis or reduction of carboxylic groups or functional derivatives thereof
  
- C07C 45/42 . by hydrolysis
- C07C 45/43 . . of >CX<sub>2</sub> groups, X being halogen
  
- C07C 45/44 . by reduction and hydrolysis of nitriles
  
- C07C 45/45 . by condensation
- C07C 45/455 . . {with carboxylic acids or their derivatives}
- C07C 45/46 . . Friedel-Crafts reactions
- C07C 45/47 . . using phosgene
- C07C 45/48 . . involving decarboxylation
  
- C07C 45/49 . by reaction with carbon monoxide
- C07C 45/50 . . by oxo-reactions
- C07C 45/505 . . . {Asymmetric hydroformylation}
  
- C07C 45/51 . by pyrolysis, rearrangement or decomposition
- C07C 45/511 . . {involving transformation of singly bound oxygen functional groups to >C = O groups (involving two hydroxy groups [C07C 45/52](#); hydroperoxides [C07C 45/53](#))}
- C07C 45/512 . . . {the singly bound functional group being a free hydroxyl group}
- C07C 45/513 . . . {the singly bound functional group being an etherified hydroxyl group}
- C07C 45/515 . . . {the singly bound functional group being an acetalised, ketalised hemi-acetalised, or hemi-ketalised hydroxyl group (cyclic acetals or ketals [C07C 45/59](#), [C07C 45/60](#))}
  
- C07C 45/516 . . {involving transformation of nitrogen-containing compounds to >C = O groups}
- C07C 45/517 . . {involving transformation of peroxy-compounds to >C = O groups}
- C07C 45/518 . . {involving transformation of sulfur-containing compounds to >C = O groups}
- C07C 45/52 . . by dehydration and rearrangement involving two hydroxy groups in the same molecule
- C07C 45/53 . . of hydroperoxides

- C07C 45/54      ..      of compounds containing doubly bound oxygen atoms, e.g. esters
- C07C 45/55      ..      of oligo- or polymeric oxo-compounds
  
- C07C 45/56      .      from heterocyclic compounds ([C07C 45/55 takes precedence](#))
- C07C 45/562      ..      {with nitrogen as the only hetero atom}
- C07C 45/565      ...      {by reaction with hexamethylene-tetramine}
- C07C 45/567      ..      {with sulfur as the only hetero atom}
- C07C 45/57      ..      with oxygen as the only heteroatom
- C07C 45/58      ...      in three-membered rings
- C07C 45/59      ...      in five-membered rings ([from ozonides C07C 45/40](#))
- C07C 45/60      ...      in six-membered rings
  
- C07C 45/61      .      by reactions not involving the formation of >C = O groups
- C07C 45/62      ..      by hydrogenation of carbon-to-carbon double or triple bonds
- C07C 45/63      ..      by introduction of halogen; by substitution of halogen atoms by other halogen atoms
- C07C 45/64      ..      by introduction of functional groups containing oxygen only in singly bound form
- C07C 45/65      ..      by splitting-off hydrogen atoms or functional groups; by hydrogenolysis of functional groups
- C07C 45/66      ...      by dehydration
- C07C 45/67      ..      by isomerisation; by change of size of the carbon skeleton
- C07C 45/673      ...      {by change of size of the carbon skeleton}
- C07C 45/676      ....      {by elimination of carboxyl groups}
- C07C 45/68      ...      by increase in the number of carbon atoms
- C07C 45/69      ....      by addition to carbon-to-carbon double or triple bonds
- C07C 45/70      ....      by reaction with functional groups containing oxygen only in singly bound form
- C07C 45/71      .....      being hydroxy groups
- C07C 45/72      ....      by reaction of compounds containing >C = O groups with the same or other compounds containing >C = O groups
- C07C 45/73      .....      combined with hydrogenation
- C07C 45/74      .....      combined with dehydration
- C07C 45/75      .....      Reactions with formaldehyde
- C07C 45/76      ...      with the aid of ketenes
  
- C07C 45/77      .      Preparation of chelates of aldehydes or ketones
  
- C07C 45/78      .      Separation; Purification; Stabilisation; Use of additives
- C07C 45/783      ..      {by gas-liquid treatment, e.g. by gas-liquid absorption}
- C07C 45/786      ..      {by membrane separation process, e.g. pervaporation, perstraction, reverse osmosis}
- C07C 45/79      ..      by solid-liquid treatment; by chemisorption
- C07C 45/80      ..      by liquid-liquid treatment

- C07C 45/81 . . by change in the physical state, e.g. crystallisation
- C07C 45/82 . . . by distillation
- C07C 45/83 . . . . by extractive distillation
- C07C 45/84 . . . . by azeotropic distillation
- C07C 45/85 . . by treatment giving rise to a chemical modification (by chemisorption [C07C 45/79](#))
- C07C 45/86 . . Use of additives, e.g. for stabilisation

- C07C 45/87 . Preparation of ketenes or dimeric ketenes (heterocyclic compounds [C07D](#))
- C07C 45/88 . . from ketones
- C07C 45/89 . . from carboxylic acids, their anhydrides, esters or halides
- C07C 45/90 . . Separation; Purification; Stabilisation; Use of additives

## **C07C 46/00 Preparation of quinones**

- C07C 46/02 . by oxidation giving rise to quinoid structures
- C07C 46/04 . . of unsubstituted ring carbon atoms in six-membered aromatic rings
- C07C 46/06 . . of at least one hydroxy group on a six-membered aromatic ring
- C07C 46/08 . . . with molecular oxygen
- C07C 46/10 . Separation; Purification; Stabilisation; Use of additives

## **C07C 47/00 Compounds having -CHO groups**

- C07C 47/02 . Saturated compounds having -CHO groups bound to acyclic carbon atoms or to hydrogen
- C07C 47/04 . . Formaldehyde
- C07C 47/06 . . Acetaldehyde
- C07C 47/105 . . containing rings
- C07C 47/11 . . . monocyclic
- C07C 47/115 . . . containing condensed ring systems
- C07C 47/12 . . containing more than one -CHO group
- C07C 47/127 . . . Glyoxal
- C07C 47/133 . . . containing rings
- C07C 47/14 . . containing halogen
- C07C 47/16 . . . Trichloroacetaldehyde
- C07C 47/17 . . . containing rings
- C07C 47/19 . . containing hydroxy groups ([sugars C07H](#))
- C07C 47/192 . . . containing rings
- C07C 47/195 . . . containing halogen
- C07C 47/198 . . containing ether groups,  $\text{>C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \end{smallmatrix}$  groups,  $\text{-C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups, or  $\text{C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$

groups

- C07C 47/20 . Unsaturated compounds having -CHO groups bound to acyclic carbon atoms
- C07C 47/21 .. with only carbon-to-carbon double bonds as unsaturation
- C07C 47/22 ... Acrylaldehyde; Methacrylaldehyde
- C07C 47/222 .. with only carbon-to-carbon triple bonds as unsaturation
- C07C 47/225 .. containing rings other than six-membered aromatic rings
- C07C 47/228 .. containing six-membered aromatic rings, e.g. phenylacetaldehyde
- C07C 47/23 ... polycyclic
- C07C 47/232 ... having unsaturation outside the aromatic rings
- C07C 47/235 .. containing six-membered aromatic rings and other rings
- C07C 47/238 ... having unsaturation outside the aromatic rings
- C07C 47/24 .. containing halogen
- C07C 47/26 .. containing hydroxy groups
- C07C 47/263 ... acyclic
- C07C 47/267 ... containing rings other than six-membered aromatic rings
- C07C 47/27 ... containing six-membered aromatic rings
- C07C 47/273 ... containing halogen
- C07C 47/277 .. containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C}\begin{smallmatrix} \text{O-} \\ \text{O-C} \end{smallmatrix}$  groups, or  $\begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups
- C07C 47/28 . Saturated compounds having -CHO groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 47/293 .. with three- or four-membered ring
- C07C 47/30 .. with a five-membered ring
- C07C 47/32 .. with a six-membered ring
- C07C 47/33 .. with a seven- to twelve-membered ring
- C07C 47/34 .. polycyclic
- C07C 47/347 ... having a -CHO group on a condensed ring system
- C07C 47/353 .. containing halogen
- C07C 47/36 .. containing hydroxy groups
- C07C 47/37 .. containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C}\begin{smallmatrix} \text{O-} \\ \text{O-C} \end{smallmatrix}$  groups, or  $\begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups
- C07C 47/38 . Unsaturated compounds having -CHO groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 47/395 .. with a three- or four-membered ring
- C07C 47/40 .. with a five-membered ring
- C07C 47/42 .. with a six-membered ring
- C07C 47/43 .. with a seven- to twelve-membered ring
- C07C 47/44 .. polycyclic

- C07C 47/445 ... containing a condensed ring system
- C07C 47/45 .. having unsaturation outside the rings
- C07C 47/453 .. containing six-membered aromatic rings
- C07C 47/457 .. containing halogen
- C07C 47/46 .. containing hydroxy groups
- C07C 47/47 .. containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C(=O)-O-C}$  groups, or  $\text{C(=O)-O-C(=O)-O-C}$  groups
- C07C 47/52 . Compounds having -CHO groups bound to carbon atoms of six-membered aromatic rings
- C07C 47/54 .. Benzaldehyde
- C07C 47/542 .. Alkylated benzaldehydes
- C07C 47/544 .. Diformyl benzenes; Alkylated derivatives thereof
- C07C 47/546 .. polycyclic
- C07C 47/548 .. having unsaturation outside the six-membered aromatic rings
- C07C 47/55 .. containing halogen
- C07C 47/56 .. containing hydroxy groups
- C07C 47/565 ... all hydroxy groups bound to the ring
- C07C 47/57 ... polycyclic
- C07C 47/575 .. containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C(=O)-O-C}$  groups, or  $\text{C(=O)-O-C(=O)-O-C}$  groups
- C07C 47/58 ... Vanillin
- C07C 49/00 Ketones; Ketenes; Dimeric ketenes (heterocyclic compounds [C07D](#), e.g. beta-lactones [C07D 305/12](#)); Ketonic chelates**
- C07C 49/04 . Saturated compounds containing keto groups bound to acyclic carbon atoms
- C07C 49/08 .. Acetone
- C07C 49/10 .. Methyl-ethyl ketone
- C07C 49/105 .. containing rings
- C07C 49/11 ... monocyclic
- C07C 49/115 ... containing condensed ring systems
- C07C 49/12 .. Ketones containing more than one keto group
- C07C 49/14 ... Acetylacetone, i.e. 2,4-pentanedione
- C07C 49/15 ... containing rings
- C07C 49/16 .. containing halogen
- C07C 49/163 ... containing rings
- C07C 49/167 ... containing only fluorine as halogen
- C07C 49/17 .. containing hydroxy groups ([sugars C07H](#))

- C07C 49/172 . . . containing rings
- C07C 49/173 . . . containing halogen
- C07C 49/175 . . containing ether groups,  $\text{>C}-\text{O}-\text{C}$  groups,  $\text{-C}-\text{O}-\text{C}$  groups, or  $\text{C}-\text{O}-\text{C}$  groups
- C07C 49/185 . . containing -CHO groups
- C07C 49/20 . Unsaturated compounds containing keto groups bound to acyclic carbon atoms
- C07C 49/203 . . with only carbon-to-carbon double bonds as unsaturation
- C07C 49/205 . . . Methyl-vinyl ketone
- C07C 49/207 . . with only carbon-to-carbon triple bonds as unsaturation
- C07C 49/21 . . containing rings other than six-membered aromatic rings
- C07C 49/213 . . containing six-membered aromatic rings
- C07C 49/215 . . . polycyclic
- C07C 49/217 . . . having unsaturation outside the aromatic rings
- C07C 49/223 . . . . polycyclic
- C07C 49/225 . . containing six-membered aromatic rings and other rings
- C07C 49/227 . . containing halogen
- C07C 49/23 . . . containing rings other than six-membered aromatic rings
- C07C 49/233 . . . containing six-membered aromatic rings
- C07C 49/235 . . . . having unsaturation outside the aromatic rings
- C07C 49/237 . . . containing six-membered aromatic rings and other rings
- C07C 49/24 . . containing hydroxy groups
- C07C 49/242 . . . containing rings other than six-membered aromatic rings
- C07C 49/245 . . . containing six-membered aromatic rings
- C07C 49/248 . . . . having unsaturation outside the aromatic rings
- C07C 49/252 . . . containing six-membered aromatic rings and other rings
- C07C 49/255 . . containing ether groups,  $\text{>C}-\text{O}-\text{C}$  groups,  $\text{-C}-\text{O}-\text{C}$  groups, or  $\text{C}-\text{O}-\text{C}$  groups
- C07C 49/258 . . containing -CHO groups
- C07C 49/29 . Saturated compounds containing keto groups bound to rings
- C07C 49/293 . . to a three- or four-membered ring
- C07C 49/297 . . to a five-membered ring
- C07C 49/303 . . to a six-membered ring
- C07C 49/307 . . to a seven- to twelve-membered ring
- C07C 49/313 . . polycyclic
- C07C 49/317 . . . both carbon atoms bound to the keto group belonging to rings
- C07C 49/323 . . . having keto groups bound to condensed ring systems
- C07C 49/327 . . containing halogen

- C07C 49/333 . . . polycyclic
- C07C 49/337 . . containing hydroxy groups
- C07C 49/345 . . . polycyclic
- C07C 49/35 . . containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C(=O)-O-C}$  groups, or  $\text{C(=O)-O-C(=O)-O-C}$  groups
- C07C 49/355 . . containing -CHO groups
- C07C 49/385 . Saturated compounds containing a keto group being part of a ring
- C07C 49/39 . . of a three- or four-membered ring
- C07C 49/395 . . of a five-membered ring
- C07C 49/403 . . of a six-membered ring
- C07C 49/407 . . . Menthones
- C07C 49/413 . . of a seven- to twelve-membered ring
- C07C 49/417 . . polycyclic
- C07C 49/423 . . . a keto group being part of a condensed ring system
- C07C 49/427 . . . . having two rings
- C07C 49/433 . . . . . the condensed ring system containing seven carbon atoms
- C07C 49/437 . . . . . Camphor; Fenchone
- C07C 49/443 . . . . . the condensed ring system containing eight or nine carbon atoms
- C07C 49/447 . . . . . the condensed ring system containing ten carbon atoms
- C07C 49/453 . . . . having three rings
- C07C 49/457 . . containing halogen
- C07C 49/463 . . . a keto group being part of a six-membered ring
- C07C 49/467 . . . polycyclic
- C07C 49/473 . . . . a keto group being part of a condensed ring system
- C07C 49/477 . . . . . having two rings
- C07C 49/483 . . . . . having three rings
- C07C 49/487 . . containing hydroxy groups
- C07C 49/493 . . . a keto group being part of a three- to five-membered ring
- C07C 49/497 . . . a keto group being part of a six-membered ring
- C07C 49/503 . . . a keto group being part of a seven- to twelve-membered ring
- C07C 49/507 . . . polycyclic
- C07C 49/513 . . . . a keto group being part of a condensed ring system
- C07C 49/517 . . containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C(=O)-O-C}$  groups, or  $\text{C(=O)-O-C(=O)-O-C}$  groups
- C07C 49/523 . . containing -CHO groups
- C07C 49/527 . Unsaturated compounds containing keto groups bound to rings other than six-membered aromatic rings

- C07C 49/533 .. to a three- or four-membered ring
- C07C 49/537 .. to a five-membered ring
- C07C 49/543 .. to a six-membered ring
- C07C 49/547 .. to a seven- to twelve-membered ring
- C07C 49/553 .. polycyclic
- C07C 49/557 .. having unsaturation outside the rings
- C07C 49/563 .. containing six-membered aromatic rings
- C07C 49/567 .. containing halogen
- C07C 49/573 .. containing hydroxy groups
- C07C 49/577 .. containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C}\begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups, or  $\begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups
- C07C 49/583 .. containing -CHO groups
- C07C 49/587 . Unsaturated compounds containing a keto groups being part of a ring
- C07C 49/593 .. of a three- or four-membered ring
- C07C 49/597 .. of a five-membered ring
- C07C 49/603 .. of a six-membered ring
- C07C 49/607 .. of a seven-to twelve-membered ring
- C07C 49/613 .. polycyclic
- C07C 49/617 ... a keto group being part of a condensed ring system
- C07C 49/623 .... having two rings
- C07C 49/627 ..... the condensed ring system containing seven carbon atoms
- C07C 49/633 ..... the condensed ring system containing eight or nine carbone atoms
- C07C 49/637 ..... the condensed ring system containing ten carbon atoms
- C07C 49/643 .... having three rings
- C07C 49/647 .. having unsaturation outside the ring
- C07C 49/653 ... polycyclic
- C07C 49/657 .. containing six-membered aromatic rings
- C07C 49/665 ... a keto group being part of a condensed ring system
- C07C 49/67 .... having two rings, e.g. tetralones
- C07C 49/675 .... having three rings
- C07C 49/683 ... having unsaturation outside the aromatic rings
- C07C 49/687 .. containing halogen
- C07C 49/693 ... polycyclic
- C07C 49/697 ... containing six-membered aromatic rings
- C07C 49/703 .. containing hydroxy groups
- C07C 49/707 ... a keto group being part of a three- to five-membered ring
- C07C 49/713 ... a keto group being part of a six-membered ring
- C07C 49/717 ... a keto group being part of a seven- to twelve-membered ring

- C07C 49/723 . . . polycyclic
- C07C 49/727 . . . . a keto group being part of a condensed ring system
- C07C 49/733 . . . . . having two rings
- C07C 49/737 . . . . . having three rings
- C07C 49/743 . . . having unsaturation outside the rings, e.g. humulones, lupulones
- C07C 49/747 . . . containing six-membered aromatic rings
- C07C 49/753 . . containing ether groups,  $\text{>C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \end{smallmatrix}$  groups,  $\text{-C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups, or  $\begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix} \end{smallmatrix}$  groups
- C07C 49/755 . . . a keto group being part of a condensed ring system with two or three rings, at least one ring being a six-membered aromatic ring
- C07C 49/757 . . containing -CHO groups
- C07C 49/76 . Ketones containing a keto group bound to a six-membered aromatic ring ([compounds having a keto group being part of a condensed ring system and being bound to a six-membered aromatic ring C07C 49/657 to C07C 49/757](#))
- C07C 49/78 . . Acetophenone
- C07C 49/782 . . polycyclic
- C07C 49/784 . . . with all keto groups bound to a non-condensed ring
- C07C 49/786 . . . . Benzophenone
- C07C 49/788 . . . with keto groups bound to a condensed ring system
- C07C 49/792 . . . containing rings other than six-membered aromatic rings
- C07C 49/794 . . having unsaturation outside an aromatic ring
- C07C 49/796 . . . polycyclic
- C07C 49/798 . . . containing rings other than six-membered aromatic rings
- C07C 49/80 . . containing halogen
- C07C 49/807 . . . all halogen atoms bound to the ring
- C07C 49/813 . . . polycyclic
- C07C 49/82 . . containing hydroxy groups
- C07C 49/825 . . . all hydroxy groups bound to the ring
- C07C 49/83 . . . polycyclic
- C07C 49/835 . . . having unsaturation outside an aromatic ring
- C07C 49/84 . . containing ether groups,  $\text{>C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \end{smallmatrix}$  groups,  $\text{-C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix}$  groups, or  $\begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{C} \begin{smallmatrix} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{smallmatrix} \end{smallmatrix}$  groups
- C07C 49/86 . . containing -CHO groups
- C07C 49/88 . Ketenes; Dimeric ketenes
- C07C 49/90 . . Ketene, i.e.  $\text{C}_2\text{H}_2\text{O}$
- C07C 49/92 . Ketonic chelates

**C07C 50/00** **Quinones** (for quinone methides, see unsaturated ketones with a keto group being part of a ring)

**NOTE**

In this group, quinhydrone are classified according to their quinoid part.

- C07C 50/02 . with monocyclic quinoid structure
- C07C 50/04 . . Benzoquinones, i.e.  $C_6H_4O_2$
- C07C 50/06 . . with unsaturation outside the quinoid structure
- C07C 50/08 . with polycyclic non-condensed quinoid structure
- C07C 50/10 . the quinoid structure being part of a condensed ring system containing two rings
- C07C 50/12 . . Naphthoquinones, i.e.  $C_{10}H_6O_2$
- C07C 50/14 . . with unsaturation outside the ring system, e.g. vitamin K1
- C07C 50/16 . the quinoid structure being part of a condensed ring system containing three rings
- C07C 50/18 . . Anthraquinones, i.e.  $C_{14}H_8O_2$
- C07C 50/20 . . with unsaturation outside the ring system
- C07C 50/22 . the quinoid structure being part of a condensed ring system containing four or more rings
- C07C 50/24 . containing halogen
- C07C 50/26 . containing groups having oxygen atoms singly bound to carbon atoms
- C07C 50/28 . . with monocyclic quinoid structure
- C07C 50/30 . . with polycyclic non-condensed quinoid structure
- C07C 50/32 . . the quinoid structure being part of a condensed ring system having two rings
- C07C 50/34 . . the quinoid structure being part of a condensed ring system having three rings
- C07C 50/36 . . the quinoid structure being part of a condensed ring system having four or more rings
- C07C 50/38 . containing -CHO or non-quinoid keto groups

**C07C 51/00** **Preparation of carboxylic acids or their salts, halides or anhydrides** (of acids by hydrolysis of oils, fats or waxes [C11C](#))

- C07C 51/02 . from salts of carboxylic acids
- C07C 51/04 . from carboxylic acid halides
- C07C 51/06 . from carboxylic acid amides

- C07C 51/08 . from nitriles
- C07C 51/083 . from carboxylic acid anhydrides
- C07C 51/087 . . by hydrolysis
- C07C 51/09 . from carboxylic acid esters or lactones
- C07C 51/093 . by hydrolysis of -CX<sub>3</sub> groups, X being halogen
- C07C 51/097 . from or via nitro-substituted organic compounds
- C07C 51/10 . by reaction with carbon monoxide
- C07C 51/12 . . on an oxygen-containing group in organic compounds, e.g. alcohols
- C07C 51/14 . . on a carbon-to-carbon unsaturated bond in organic compounds
- C07C 51/145 . . with simultaneous oxidation
- C07C 51/15 . by reaction of organic compounds with carbon dioxide, e.g. Kolbe-Schmitt synthesis
- C07C 51/16 . by oxidation ([C07C 51/145 takes precedence](#))
- C07C 51/21 . . with molecular oxygen
- C07C 51/215 . . . of saturated hydrocarbyl groups
- C07C 51/225 . . . . of paraffin waxes
- C07C 51/23 . . . of oxygen-containing groups to carboxyl groups
- C07C 51/235 . . . . of -CHO groups or primary alcohol groups
- C07C 51/245 . . . . of keto groups or secondary alcohol groups
- C07C 51/25 . . . of unsaturated compounds containing no six-membered aromatic ring
- C07C 51/252 . . . . {of propene, butenes, acrolein or methacrolein}
- C07C 51/255 . . . of compounds containing six-membered aromatic rings without ring-splitting
- C07C 51/265 . . . . having alkyl side chains which are oxidised to carboxyl groups

#### **NOTE**

Reactions of the Katzschnmann type, i.e. oxidation of a dialkyl-aromatic compound with intermediate esterification of the mono-acid, see relevant ester groups, even when the end product is a carboxylic acid

- C07C 51/27 . . with oxides of nitrogen or nitrogen-containing mineral acids
- C07C 51/275 . . . of hydrocarbyl groups
- C07C 51/285 . . with peroxy-compounds
- C07C 51/29 . . with halogen-containing compounds which may be formed in situ
- C07C 51/295 . . with inorganic bases, e.g. by alkali fusion
- C07C 51/305 . . with sulfur or sulfur-containing compounds
- C07C 51/31 . . of cyclic compounds with ring-splitting
- C07C 51/313 . . . {with molecular oxygen}

- C07C 51/316 . . . {with oxides of nitrogen or nitrogen-containing mineral acids}
- C07C 51/34 . by oxidation with ozone; by hydrolysis of ozonides
- C07C 51/347 . by reactions not involving formation of carboxyl groups
- C07C 51/353 . . by isomerisation; by change of size of the carbon skeleton
- C07C 51/36 . . by hydrogenation of carbon-to-carbon unsaturated bonds
- C07C 51/363 . . by introduction of halogen; by substitution of halogen atoms by other halogen atoms
- C07C 51/367 . . by introduction of functional groups containing oxygen only in singly bound form
- C07C 51/373 . . by introduction of functional groups containing oxygen only in doubly bound form
- C07C 51/377 . . by splitting-off hydrogen or functional groups; by hydrogenolysis of functional groups {C07C 51/36 to C07C 51/373 take precedence}
- C07C 51/38 . . . by decarboxylation
- C07C 51/41 . Preparation of salts of carboxylic acids (preparation of soap C11D){C07C 51/093 to C07C 51/34 take precedence}
- C07C 51/412 . . {by conversion of the acids, their salts, esters or anhydrides with the same carboxylic acid part}
- C07C 51/414 . . {Preparation of superbasic salts}
- C07C 51/416 . . {Henkel reaction and related reactions, i.e. rearrangement of carboxylate salt groups linked to six-membered aromatic rings, in the absence or in the presence of CO or CO<sub>2</sub>, (e.g. preparation of terepholates from benzoates); no additional classification for the subsequent hydrolysis of the salt groups has to be given}
- C07C 51/418 . . {Preparation of metal complexes containing carboxylic acid moieties}
- C07C 51/42 . Separation; Purification; Stabilisation; Use of additives
- C07C 51/43 . . by change of the physical state, e.g. crystallisation
- C07C 51/44 . . . by distillation
- C07C 51/445 . . . . {by steam distillation}
- C07C 51/46 . . . . by azeotropic distillation
- C07C 51/47 . . by solid-liquid treatment; by chemisorption
- C07C 51/48 . . by liquid-liquid treatment
- C07C 51/487 . . by treatment giving rise to chemical modification (by chemisorption C07C 51/47)
- C07C 51/493 . . . whereby carboxylic acid esters are formed
- C07C 51/50 . . Use of additives e.g. for stabilisation
- C07C 51/54 . Preparation of carboxylic acid anhydrides (by oxidation C07C 51/16)
- C07C 51/56 . . from organic acids, their salts, their esters {or their halides, e.g. by carboxylation}
- C07C 51/567 . . by reactions not involving carboxylic acid anhydride groups
- C07C 51/573 . . Separation; Purification; Stabilisation; Use of additives
- C07C 51/58 . Preparation of carboxylic acid halides
- C07C 51/60 . . by conversion of carboxylic acids or their anhydrides {or esters, lactones, salts} into halides with the same carboxylic acid part

- C07C 51/62 . . by reactions not involving the carboxylic acid halide group
- C07C 51/64 . . Separation; Purification; Stabilisation; Use of additives

**C07C 53/00 Saturated compounds having only one carboxyl group bound to an acyclic carbon atom or hydrogen**

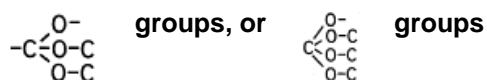
- C07C 53/02 . Formic acid
- C07C 53/06 . . Salts thereof
- C07C 53/08 . Acetic acid ([pyroligneous acid C10C](#); [preparation of vinegar C12J](#))
- C07C 53/10 . . Salts thereof
- C07C 53/12 . Acetic anhydride ([ketene C07C 49/90](#))
- C07C 53/122 . Propionic acid
- C07C 53/124 . Acids containing four carbon atoms
- C07C 53/126 . Acids containing more than four carbon atoms
- C07C 53/128 . . the carboxylic group being bound to a carbon atom bound to at least two other carbon atoms, e.g. neo-acids
- C07C 53/132 . containing rings
- C07C 53/134 . . monocyclic
- C07C 53/136 . . containing condensed ring systems
- C07C 53/138 . . . containing an adamantane ring system
- C07C 53/15 . containing halogen
- C07C 53/16 . . Halogenated acetic acids
- C07C 53/18 . . . containing fluorine
- C07C 53/19 . . Acids containing three or more carbon atoms
- C07C 53/21 . . . containing fluorine
- C07C 53/23 . . containing rings
- C07C 53/38 . Acyl halides
- C07C 53/40 . . Acetyl halides
- C07C 53/42 . . of acids containing three or more carbon atoms
- C07C 53/44 . . containing rings
- C07C 53/46 . . containing halogen outside the carbonyl halide group
- C07C 53/48 . . . Halogenated acetyl halides
- C07C 53/50 . . . of acids containing three or more carbon atoms

**C07C 55/00 Saturated compounds having more than one carboxyl group bound to acyclic carbon atoms**

- C07C 55/02 . Dicarboxylic acids
- C07C 55/06 .. Oxalic acid
- C07C 55/07 ... Salts thereof
- C07C 55/08 .. Malonic acid
- C07C 55/10 .. Succinic acid
- C07C 55/12 .. Glutaric acid
- C07C 55/14 .. Adipic acid
- C07C 55/16 .. Pimelic acid
- C07C 55/18 .. Azelaic acid
- C07C 55/20 .. Sebacic acid
- C07C 55/21 .. Dicarboxylic acids containing twelve carbon atoms
- C07C 55/22 . Tricarboxylic acids
- C07C 55/24 . containing more than three carboxyl groups
- C07C 55/26 . containing rings {other than aromatic rings}
- C07C 55/28 .. monocyclic
- C07C 55/30 .. containing condensed ring systems
- C07C 55/32 . containing halogen
- C07C 55/34 .. containing rings
- C07C 55/36 . Acyl halides
- C07C 55/38 .. containing rings
- C07C 55/40 .. containing halogen outside the carboxyl halide group
- C07C 57/00      Unsaturated compounds having carboxyl groups bound to acyclic carbon atoms**
- C07C 57/02 . with only carbon-to-carbon double bonds as unsaturation
- C07C 57/03 .. Monocarboxylic acids
- C07C 57/04 ... Acrylic acid; Methacrylic acid
- C07C 57/08 ... Crotonic acid
- C07C 57/10 ... Sorbic acid
- C07C 57/12 ... Straight chain carboxylic acids containing eighteen carbon atoms
- C07C 57/13 .. Dicarboxylic acids
- C07C 57/145 ... Maleic acid
- C07C 57/15 ... Fumaric acid
- C07C 57/155 ... Citraconic acid
- C07C 57/16 ... Muconic acid
- C07C 57/18 . with only carbon-to-carbon triple bonds as unsaturation

- C07C 57/20 . . Propiolic acid
- C07C 57/22 . . Acetylene dicarboxylic acid
- C07C 57/24 . . Diacetylene or polyacetylene dicarboxylic acids
  
- C07C 57/26 . containing rings other than six-membered aromatic rings
- C07C 57/28 . . containing an adamantane ring system
  
- C07C 57/30 . containing six-membered aromatic rings
- C07C 57/32 . . Phenylacetic acid
- C07C 57/34 . . containing more than one carboxyl group
- C07C 57/36 . . . Phenymalonic acid
- C07C 57/38 . . polycyclic
- C07C 57/40 . . . containing condensed ring systems
- C07C 57/42 . . having unsaturation outside the rings
- C07C 57/44 . . . Cinnamic acid
  
- C07C 57/46 . containing six-membered aromatic rings and other rings, e.g. cyclohexylphenylacetic acid
  
- C07C 57/48 . . having unsaturation outside the aromatic rings
- C07C 57/50 . . containing condensed ring systems
  
- C07C 57/52 . containing halogen
- C07C 57/54 . . Halogenated acrylic or methacrylic acids
- C07C 57/56 . . containing rings other than six-membered aromatic rings
- C07C 57/58 . . containing six-membered aromatic rings
- C07C 57/60 . . . having unsaturation outside the rings
- C07C 57/62 . . containing six-membered aromatic rings and other rings
  
- C07C 57/64 . Acyl halides
- C07C 57/66 . . with only carbon-to-carbon double bonds as unsaturation
- C07C 57/68 . . with only carbon-to-carbon triple bonds as unsaturation
- C07C 57/70 . . containing rings other than six-membered aromatic rings
- C07C 57/72 . . containing six-membered aromatic rings
- C07C 57/74 . . containing six-membered aromatic rings and other rings
- C07C 57/76 . . containing halogen outside the carbonyl halide group

**C07C 59/00** **Compounds having carboxyl groups bound to acyclic carbon atoms and containing any of the groups OH, O-metal, -CHO, keto, ether,  $\text{>C}=\text{O}$  groups,**



- C07C 59/01 . Saturated compounds having only one carboxyl group and containing hydroxy or O-metal groups

- C07C 59/06 .. Glycolic acid
- C07C 59/08 .. Lactic acid
- C07C 59/10 .. Polyhydroxy carboxylic acids
- C07C 59/105 ... having five or more carbon atoms, e.g. aldonic acids
- C07C 59/11 .. containing rings
- C07C 59/115 .. containing halogen
  
- C07C 59/125 . Saturated compounds having only one carboxyl group and containing ether groups,  
 $\text{>C} \begin{array}{c} \text{O-} \\ \text{O-C} \end{array}$  groups,  $\text{-C} \begin{array}{c} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{array}$  groups, or  $\begin{array}{c} \text{O-} \\ \text{O-C} \\ \text{C} \begin{array}{c} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{array} \end{array}$  groups
  
- C07C 59/13 .. containing rings
- C07C 59/135 .. containing halogen
  
- C07C 59/147 . Saturated compounds having only one carboxyl group and containing -CHO groups
- C07C 59/153 .. Glyoxylic acid
  
- C07C 59/185 . Saturated compounds having only one carboxyl group and containing keto groups
- C07C 59/19 .. Pyruvic acid
- C07C 59/195 .. Acetoacetic acid
- C07C 59/205 .. containing rings
- C07C 59/21 .. containing halogen
- C07C 59/215 .. containing singly bound oxygen containing groups
- C07C 59/225 .. containing -CHO groups
  
- C07C 59/235 . Saturated compounds containing more than one carboxyl group
- C07C 59/245 .. containing hydroxy or O-metal groups
- C07C 59/255 ... Tartaric acid
- C07C 59/265 ... Citric acid
- C07C 59/285 ... Polyhydroxy dicarboxylic acids having five or more carbon atoms, e.g. saccharic acids
- C07C 59/29 ... containing rings
- C07C 59/295 ... containing halogen
- C07C 59/305 .. containing ether groups,  $\text{>C} \begin{array}{c} \text{O-} \\ \text{O-C} \end{array}$  groups,  $\text{-C} \begin{array}{c} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{array}$  groups, or  $\begin{array}{c} \text{O-} \\ \text{O-C} \\ \text{C} \begin{array}{c} \text{O-} \\ \text{O-C} \\ \text{O-C} \end{array} \end{array}$  groups
  
- C07C 59/31 ... containing rings
- C07C 59/315 ... containing halogen
- C07C 59/325 .. containing -CHO groups
- C07C 59/347 .. containing keto groups
- C07C 59/353 ... containing rings
  
- C07C 59/40 . Unsaturated compounds

- C07C 59/42 . . . containing hydroxy or O-metal groups
- C07C 59/44 . . . Ricinoleic acid
- C07C 59/46 . . . containing rings other than six-membered aromatic rings
- C07C 59/48 . . . containing six-membered aromatic rings
- C07C 59/50 . . . . . Mandelic acid
- C07C 59/52 . . . a hydroxy or O-metal group being bound to a carbon atom of a six-membered aromatic ring
- C07C 59/54 . . . containing six-membered aromatic rings and other rings
- C07C 59/56 . . . containing halogen
- C07C 59/58 . . . containing ether groups,  $\text{>C-O-C}$  groups,  $\text{-C(=O)-O-C}$  groups, or  $\text{C(=O)-O-C(=O)-O-C}$  groups
- C07C 59/60 . . . the non-carboxylic part of the ether being unsaturated
- C07C 59/62 . . . containing rings other than six-membered aromatic rings
- C07C 59/64 . . . containing six-membered aromatic rings
- C07C 59/66 . . . . . the non-carboxylic part of the ether containing six-membered aromatic rings
- C07C 59/68 . . . . . the oxygen atom of the ether group being bound to a non-condensed six-membered aromatic ring
- C07C 59/70 . . . . . Ethers of hydroxy-acetic acid, {e.g. substitutes on the ring}
- C07C 59/72 . . . containing six-membered aromatic rings and other rings
- C07C 59/74 . . . containing -CHO groups
- C07C 59/76 . . . containing keto groups
- C07C 59/80 . . . containing rings other than six-membered aromatic rings
- C07C 59/82 . . . . . the keto group being part of a ring
- C07C 59/84 . . . containing six membered aromatic rings
- C07C 59/86 . . . containing six-membered aromatic rings and other rings
- C07C 59/88 . . . containing halogen
- C07C 59/90 . . . containing singly bound oxygen-containing groups
- C07C 59/92 . . . containing -CHO groups

**C07C 61/00 Compounds having carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings**

**NOTE**

The oxidation mixture of naphthenes containing naphthenic acids, is classified in [C07C 61/005](#)

- C07C 61/005 . Naphthenic acids
- C07C 61/04 . Saturated compounds having a carboxyl group bound to a three or four-membered ring

- C07C 61/06 . Saturated compounds having a carboxyl group bound to a five-membered ring
- C07C 61/08 . Saturated compounds having a carboxyl group bound to a six-membered ring
- C07C 61/09 . . Completely hydrogenated benzenedicarboxylic acids
- C07C 61/10 . Saturated compounds having a carboxyl group bound to a seven-to-twelve-membered ring
- C07C 61/12 . Saturated polycyclic compounds
- C07C 61/125 . . having a carboxyl group bound to a condensed ring system
- C07C 61/13 . . . having two rings
- C07C 61/135 . . . having three rings
- C07C 61/15 . Saturated compounds containing halogen
- C07C 61/16 . Unsaturated compounds
- C07C 61/20 . . having a carboxyl group bound to a five-membered ring
- C07C 61/22 . . having a carboxyl group bound to a six-membered ring
- C07C 61/24 . . . Partially hydrogenated benzenedicarboxylic acids
- C07C 61/26 . . having a carboxyl group bound to a seven-to-twelve-membered ring
- C07C 61/28 . . polycyclic
- C07C 61/29 . . . having a carboxyl group bound to a condensed ring system
- C07C 61/35 . . having unsaturation outside the rings
- C07C 61/37 . . . Chrysanthemumic acid
- C07C 61/39 . . containing six-membered aromatic rings
- C07C 61/40 . . containing halogen

**C07C 62/00** **Compounds having carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings and containing any of the groups OH, O-metal, -CHO, keto, ether,  $\begin{array}{c} \text{O}^- \\ | \\ >\text{C}-\text{O}-\text{C} \end{array}$  groups,  $\begin{array}{c} \text{O}^- \\ | \\ -\text{C}-\text{O}-\text{C} \\ | \\ \text{O}-\text{C} \end{array}$  groups, or  $\begin{array}{c} \text{O}^- \\ | \\ \text{C} < \begin{array}{l} \text{O}-\text{C} \\ \text{O}-\text{C} \\ \text{O}-\text{C} \end{array} \end{array}$  groups**

- C07C 62/02 . Saturated compounds containing hydroxy or O-metal groups
- C07C 62/04 . . with a six-membered ring
- C07C 62/06 . . polycyclic
- C07C 62/08 . Saturated compounds containing ether groups,  $\begin{array}{c} \text{O}^- \\ | \\ >\text{C}-\text{O}-\text{C} \end{array}$  groups,  $\begin{array}{c} \text{O}^- \\ | \\ -\text{C}-\text{O}-\text{C} \\ | \\ \text{O}-\text{C} \end{array}$  groups, or  $\begin{array}{c} \text{O}^- \\ | \\ \text{C} < \begin{array}{l} \text{O}-\text{C} \\ \text{O}-\text{C} \\ \text{O}-\text{C} \end{array} \end{array}$  groups
- C07C 62/10 . . with a six-membered ring
- C07C 62/12 . . polycyclic

- C07C 62/14 . . . having a carboxyl group on a condensed ring system
- C07C 62/16 . Saturated compounds containing -CHO groups
- C07C 62/18 . Saturated compounds containing keto groups
- C07C 62/20 . . with a {saturated} six-membered ring
- C07C 62/22 . . polycyclic
- C07C 62/24 . . the keto group being part of a ring
- C07C 62/26 . . containing singly bound oxygen-containing groups
- C07C 62/28 . . containing -CHO groups
- C07C 62/30 . Unsaturated compounds
- C07C 62/32 . . containing hydroxy or O-metal groups
- C07C 62/34 . . containing ether groups,  $\text{>C} \begin{smallmatrix} \text{O}^- \\ \text{O}-\text{C} \end{smallmatrix}$  groups,  $\text{-C} \begin{smallmatrix} \text{O}^- \\ \text{O}-\text{C} \\ \text{O}-\text{C} \end{smallmatrix}$  groups, or  $\text{C} \begin{smallmatrix} \text{O}^- \\ \text{O}-\text{C} \\ \text{O}-\text{C} \\ \text{O}-\text{C} \end{smallmatrix}$  groups
- C07C 62/36 . . containing -CHO groups
- C07C 62/38 . . containing keto groups
- C07C 63/00** **Compounds having carboxyl groups bound to a carbon atom of six-membered aromatic rings**
  - C07C 63/04 . Monocyclic monocarboxylic acids
  - C07C 63/06 . . Benzoic acid
  - C07C 63/08 . . . Salts thereof
  - C07C 63/10 . . . Halides thereof
  - C07C 63/14 . Monocyclic dicarboxylic acids
  - C07C 63/15 . . all carboxyl groups bound to carbon atoms of the six-membered aromatic ring
  - C07C 63/16 . . . 1,2 - Benzenedicarboxylic acid
  - C07C 63/20 . . . . Salts thereof
  - C07C 63/22 . . . . Halides thereof
  - C07C 63/24 . . . 1,3 - Benzenedicarboxylic acid
  - C07C 63/26 . . . 1,4 - Benzenedicarboxylic acid
  - C07C 63/28 . . . . Salts thereof
  - C07C 63/30 . . . . Halides thereof
  - C07C 63/307 . Monocyclic tricarboxylic acids
  - C07C 63/313 . Monocyclic acids containing more than three carboxyl groups
  - C07C 63/33 . Polycyclic acids
  - C07C 63/331 . . with all carboxyl groups bound to non-condensed rings

- C07C 63/333 . . . 4,4' - Diphenyldicarboxylic acids
- C07C 63/337 . . with carboxyl groups bound to condensed ring systems
- C07C 63/34 . . . containing two {condensed} rings
- C07C 63/36 . . . . containing one carboxyl group
- C07C 63/38 . . . . containig two carboxyl groups both bound to carbon atoms of the condensed ring system
- C07C 63/40 . . . . containing three or more carboxyl groups all bound to carbon atoms of the condensed ring system
- C07C 63/42 . . . containing three or more {condensed} rings
- C07C 63/44 . . . . containing one carboxyl group
- C07C 63/46 . . . . containing two carboxyl groups both bound to carbon atoms of the condensed ring system
- C07C 63/48 . . . . containing three or more carboxyl groups all bound to carbon atoms of the condensed ring system
- C07C 63/49 . . containing rings other than six-membered aromatic rings
- C07C 63/64 . Monocyclic acids with unsaturation outside the aromatic ring
- C07C 63/66 . Polycyclic acids with unsaturation outside the aromatic ring
- C07C 63/68 . containing halogen
- C07C 63/70 . . Monocarboxylic acids
- C07C 63/72 . . Polycyclic acids
- C07C 63/74 . . . having unsaturation outside the aromatic rings

**C07C 65/00** **Compounds having carboxyl groups bound to carbon atoms of six-membered aromatic rings and containing any of the groups OH, O-metal, -CHO, keto, ether, groups, or groups(cyclic anhydrides [C07D](#))**



groups,



groups, or



groups

- C07C 65/01 . containing hydroxy or O-metal groups
- C07C 65/03 . . monocyclic and having all hydroxy or O-metal groups bound to the ring
- C07C 65/05 . . . o-Hydrocy carboxylic acids
- C07C 65/10 . . . . Salicylic acid
- C07C 65/105 . . polycyclic
- C07C 65/11 . . . with carboxyl groups on a condensed ring system containing two rings
- C07C 65/15 . . . with carboxyl groups on a condensed ring system containing more than two rings
- C07C 65/17 . . containing rings other than six-membered aromatic rings
- C07C 65/19 . . having unsaturation outside the aromatic ring
- C07C 65/21 . containing ether groups,  $\begin{array}{c} \text{O}^- \\ | \\ >\text{C}-\text{O}-\text{C} \end{array}$  groups,  $\begin{array}{c} \text{O}^- \\ | \\ -\text{C}-\text{O}-\text{C} \\ | \\ \text{O}-\text{C} \end{array}$  groups, or  $\begin{array}{c} \text{O}^- \\ | \\ \text{C}-\text{O}-\text{C} \\ | \\ \text{O}-\text{C} \\ | \\ \text{O}-\text{C} \end{array}$  groups


- C07C 65/24 . . polycyclic
- C07C 65/26 . . . containing rings other than six-membered aromatic rings
- C07C 65/28 . . having unsaturation outside the aromatic rings
- C07C 65/30 . containing -CHO groups
- C07C 65/32 . containing keto groups
- C07C 65/34 . . polycyclic
- C07C 65/36 . . . containing rings other than six-membered aromatic rings
- C07C 65/38 . . having unsaturation outside the aromatic rings
- C07C 65/40 . . containing singly bound oxygen-containing groups
- C07C 65/42 . . containing -CHO groups

### **C07C 66/00 Quinone carboxylic acids**

- C07C 66/02 . Anthraquinone carboxylic acids

### **C07C 67/00 Preparation of carboxylic acid esters**

- C07C 67/02 . by interreacting ester groups, i.e. transesterification
- C07C 67/03 . by reacting an ester group with a hydroxy group
- C07C 67/035 . by reacting carboxylic acids or symmetrical anhydrides with saturated hydrocarbons
- C07C 67/04 . by reacting carboxylic acids or symmetrical anhydrides onto unsaturated carbon-to-carbon bonds
- C07C 67/05 . . with oxidation
- C07C 67/055 . . . in the presence of platinum group metals or their compounds
- C07C 67/08 . by reacting carboxylic acids or symmetrical anhydrides with the hydroxy or O-metal group of organic compounds
- C07C 67/10 . by reacting carboxylic acids or symmetrical anhydrides with ester groups or with a carbon-halogen bond ([preparation from carboxylic acid halides C07C 67/14](#))
- C07C 67/11 . . being mineral ester groups
- C07C 67/12 . from unsymmetrical anhydrides
- C07C 67/14 . from carboxylic acid halides
- C07C 67/16 . form carboxylic acids, esters or anhydrides wherein one oxygen atom has been replaced by a sulfur, selenium or tellurium atom
- C07C 67/18 . by conversion of a group containing nitrogen into an ester group
- C07C 67/20 . . from amides or lactams

- C07C 67/22      . .      from nitriles
- C07C 67/24      .      by reacting carboxylic acids or derivatives thereof with a carbon-to-oxygen ether bond, e.g. acetal, tetrahydrofuran
- C07C 67/26      . .      with an oxirane ring
- C07C 67/27      .      from ortho-esters
- C07C 67/28      .      by modifying the hydroxylic moiety of the ester, such modification not being an introduction of an ester group
- C07C 67/283      . .      by hydrogenation of unsaturated carbon-to-carbon bonds
- C07C 67/287      . .      by introduction of halogen; by substitution of halogen atoms by other halogen atoms
- C07C 67/29      . .      by introduction of oxygen-containing functional groups
- C07C 67/293      . .      by isomerisation; by change of size of the carbon skeleton
- C07C 67/297      . .      by splitting-off hydrogen or functional groups; by hydrogenolysis of functional groups
- C07C 67/30      .      by modifying the acid moiety of the ester, such modification not being an introduction of an ester group
- C07C 67/303      . .      by hydrogenation of unsaturated carbon-to-carbon bonds
- C07C 67/307      . .      by introduction of halogen; by substitution of halogen atoms by other halogen atoms
- C07C 67/31      . .      by introduction of functional groups containing oxygen only in singly bound form
- C07C 67/313      . .      by introduction of doubly bound oxygen containing functional groups, e.g. carboxyl groups
- C07C 67/317      . .      by splitting-off hydrogen or functional groups; by hydrogenolysis of functional groups
- C07C 67/32      . . .      Decarboxylation
- C07C 67/327      . . .      by elimination of functional groups containing oxygen only in singly bound form
- C07C 67/333      . .      by isomerisation; by change of size of the carbon skeleton ([introduction or elimination of carboxyl groups C07C 67/313, C07C 67/32](#))
- C07C 67/34      . . .      Migration of  groups in the molecule
- C07C 67/343      . . .      by increase in the number of carbon atoms
- C07C 67/347      . . . .      by addition to unsaturated carbon-to-carbon bonds
- C07C 67/36      .      by reaction with carbon monoxide or formates ([C07C 67/02, C07C 67/03, C07C 67/10 take precedence](#))
- C07C 67/37      . .      by reaction of ethers with carbon monoxide
- C07C 67/38      . .      by addition to an unsaturated carbon-to-carbon bond
- C07C 67/39      .      by oxidation of groups which are precursors for the acid moiety of the ester
- C07C 67/40      . .      by oxidation of primary alcohols
- C07C 67/42      . .      by oxidation of secondary alcohols or ketones

- C07C 67/44 . by oxidation-reduction of aldehydes, e.g. Tishchenko reaction
- C07C 67/46 . from ketenes or polyketenes
- C07C 67/465 . by oligomerisation
- C07C 67/47 . by telomerisation ([macromolecular compounds C08](#))
- C07C 67/475 . by splitting of carbon-to-carbon bonds and redistribution, e.g. disproportionation or migration of  $\text{-COOC-}$  groups between different molecules
- C07C 67/48 . Separation; Purification; Stabilisation; Use of additives
- C07C 67/52 . . by change in the physical state, e.g. crystallisation
- C07C 67/54 . . . by distillation
- C07C 67/56 . . by solid-liquid treatment; by chemisorption
- C07C 67/58 . . by liquid-liquid treatment
- C07C 67/60 . . by treatment giving rise to chemical modification ([by chemisorption C07C 67/56](#))
- C07C 67/62 . . Use of additives, e.g. for stabilisation

#### **C07C 68/00 Preparation of esters of carbonic or haloformic acids**

- C07C 68/005 . {from carbon monoxide and oxygen}
- C07C 68/02 . from phosgene or haloformates
- C07C 68/04 . from carbon dioxide or inorganic carbonates
- C07C 68/06 . from organic carbonates
- C07C 68/065 . . {from alkylene carbonates}
- C07C 68/08 . Purification; Separation; Stabilisation

#### **C07C 69/00 Esters of carboxylic acids; Esters of carbonic or haloformic acids ([ortho esters](#), see the relevant groups, e.g. [C07C 43/32](#))**

##### **NOTE**

In this group esters having a variably-specified acid moiety, i.e. covered by more than one of groups [C07C 69/02](#), [C07C 69/34](#), [C07C 69/52](#), [C07C 69/608](#), [C07C 69/612](#), [C07C 69/62](#), [C07C 69/66](#), [C07C 69/74](#), [C07C 69/76](#), [C07C 69/95](#), [C07C 69/96](#), are covered by groups [C07C 69/003](#) to [C07C 69/017](#) according to their hydroxylic moiety

- C07C 69/003 . Esters of saturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom

- C07C 69/007 . Esters of unsaturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom
- C07C 69/01 .. Vinyl esters
- C07C 69/013 . Esters of alcohols having the esterified hydroxy group bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 69/017 . Esters of hydroxy compounds having the esterified hydroxy group bound to a carbon atom of a six-membered aromatic ring
- C07C 69/02 . Esters of acyclic saturated monocarboxylic acids having the carboxyl group bound to an acyclic carbon atom or to hydrogen
- C07C 69/04 .. Formic acid esters
- C07C 69/06 ... of monohydroxylic compounds
- C07C 69/07 .... of unsaturated alcohols
- C07C 69/08 ... of dihydroxylic compounds
- C07C 69/10 ... of trihydroxylic compounds
- C07C 69/12 .. Acetic acid esters
- C07C 69/14 ... of monohydroxylic compounds
- C07C 69/145 .... of unsaturated alcohols
- C07C 69/15 ..... Vinyl acetate
- C07C 69/155 ..... Allyl acetate
- C07C 69/157 ..... containing six-membered aromatic rings
- C07C 69/16 ... of dihydroxylic compounds
- C07C 69/18 ... of trihydroxylic compounds
- C07C 69/21 ... of hydroxy compounds with more than three hydroxy groups ([esters of sugars C07H](#))
- C07C 69/22 .. having three or more carbon atoms in the acid moiety
- C07C 69/24 ... esterified with monohydroxylic compounds
- C07C 69/26 .... Synthetic waxes
- C07C 69/28 ... esterified with dihydroxylic compounds
- C07C 69/30 ... esterified with trihydroxylic compounds ([fats, oils C11B](#), [C11C](#))
- C07C 69/33 ... esterified with hydroxy compounds having more than three hydroxy groups ([esters of sugars C07H](#))
- C07C 69/34 . Esters of acyclic saturated polycarboxylic acids having an esterified carboxyl group bound to an acyclic carbon atom
- C07C 69/36 .. Oxalic acid esters
- C07C 69/38 .. Malonic acid esters
- C07C 69/40 .. Succinic acid esters
- C07C 69/42 .. Glutaric acid esters
- C07C 69/44 .. Adipic acid esters
- C07C 69/46 .. Pimelic acid esters

- C07C 69/48 .. Azelaic acid esters
- C07C 69/50 .. Sebacic acid esters
- C07C 69/52 . Esters of acyclic unsaturated carboxylic acids having the esterified carboxyl group bound to an acyclic carbon atom
- C07C 69/533 .. Monocarboxylic acid esters having only one carbon-to-carbon double bond
- C07C 69/54 ... Acrylic acid esters; Methacrylic acid esters
- C07C 69/56 ... Crotonic acid esters; Vinyl acetic acid esters
- C07C 69/58 ... Esters of straight chain acids with eighteen carbon atoms in the acid moiety
- C07C 69/587 .. Monocarboxylic acid esters having at least two carbon-to-carbon double bonds
- C07C 69/593 .. Dicarboxylic acid esters having only one carbon-to-carbon double bond
- C07C 69/60 ... Maleic acid esters; Fumaric acid esters
- C07C 69/602 .. Dicarboxylic acid esters having at least two carbon-to-carbon double bonds
- C07C 69/604 .. Polycarboxylic acid esters, the acid moiety containing more than two carboxyl groups
- C07C 69/606 .. having only {or additionally} carbon-to-carbon triple bonds as unsaturation in the carboxylic acid moiety
- C07C 69/608 . Esters of carboxylic acids having a carboxyl group bound to an acyclic carbon atom and having a ring other than a six-membered aromatic ring in the acid moiety
- C07C 69/612 . Esters of carboxylic acids having a carboxyl group bound to an acyclic carbon atom and having a six-membered aromatic ring in the acid moiety
- C07C 69/614 .. of phenylacetic acid
- C07C 69/616 .. polycyclic
- C07C 69/618 .. having unsaturation outside the six-membered aromatic ring
- C07C 69/62 . Halogen-containing esters (haloformic acid esters [C07C 69/96](#))
- C07C 69/63 .. of saturated acids
- C07C 69/635 ... containing rings in the acid moiety
- C07C 69/65 .. of unsaturated acids
- C07C 69/653 ... Acrylic acid esters; Methacrylic acid esters; Haloacrylic acid esters; Halomethacrylic acid esters
- C07C 69/657 ... Maleic acid esters; Fumaric acid esters; Halomaleic acid esters; Halofumaric acid esters
- C07C 69/66 . Esters of carboxylic acids having esterified carboxylic groups bound to acyclic carbon atoms and having any of the groups OH, O-metal, -CHO, keto, ether, acyloxy,  $\begin{array}{c} \text{O} \\ \diagup \text{C} \diagdown \\ \text{O} \end{array}$  groups,  $\begin{array}{c} \text{O} \\ \diagup \text{C} \diagdown \\ \text{O} \end{array}$  groups, or  $\begin{array}{c} \text{O} \\ \diagup \text{C} \diagdown \\ \text{O} \end{array}$  in the acid moiety
- C07C 69/67 .. of saturated acids
- C07C 69/675 ... of saturated hydroxy-carboxylic acids
- C07C 69/68 .... Lactic acid esters
- C07C 69/70 .... Tartaric acid esters

- C07C 69/704 . . . . Citric acid esters
- C07C 69/708 . . . Ethers
- C07C 69/712 . . . . the hydroxy group of the ester being etherified with a hydroxy compound having the hydroxy group bound to a carbon atom of a six-membered aromatic ring
- C07C 69/716 . . . Esters of keto-carboxylic acids {or aldehydo-carboxylic acids}
- C07C 69/72 . . . . Acetoacetic acid esters
- C07C 69/73 . . of unsaturated acids
- C07C 69/732 . . . of unsaturated hydroxy carboxylic acids
- C07C 69/734 . . . Ethers
- C07C 69/736 . . . . the hydroxy group of the ester being etherified with a hydroxy compound having the hydroxy group bound to a carbon atom of a six-membered aromatic ring
- C07C 69/738 . . . Esters of keto-carboxylic acids {or aldehydo-carboxylic acids}
- C07C 69/74 . Esters of carboxylic acids having an esterified carboxyl group bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 69/743 . . of acids with a three-membered ring and with unsaturation outside the ring
- C07C 69/747 . . . Chrysanthemic acid esters
- C07C 69/75 . . of acids with a six-membered ring
- C07C 69/753 . . of polycyclic acids
- C07C 69/757 . . having any of the groups OH, O-metal, -CHO, keto, ether, acyloxy,  $>\text{C}(\text{O})-\text{O}-\text{C}$  groups,  $-\text{C}(\text{O})-\text{O}-\text{C}$  groups, or  $\begin{array}{c} \text{O}- \\ \diagup \text{C} \diagdown \\ \text{O}-\text{C} \\ \text{O}-\text{C} \end{array}$  in the acid moiety
- C07C 69/76 . Esters of carboxylic acids having a carboxyl group bound to a carbon atom of a six-membered aromatic ring
- C07C 69/78 . . Benzoic acid esters
- C07C 69/80 . . Phthalic acid esters
- C07C 69/82 . . . Terephthalic acid esters
- C07C 69/84 . . of monocyclic hydroxy carboxylic acids, the hydroxy groups and the carboxyl groups of which are bound to carbon atoms of a six-membered aromatic ring
- C07C 69/86 . . . with esterified hydroxyl groups
- C07C 69/88 . . . with esterified carboxyl groups
- C07C 69/90 . . . with esterified hydroxyl and carboxyl groups
- C07C 69/92 . . . with etherified hydroxyl groups
- C07C 69/94 . . of polycyclic hydroxy carboxylic acids, the hydroxy groups and the carboxyl groups of which are bound to carbon atoms of six-membered aromatic rings
- C07C 69/95 . Esters of quinone carboxylic acids
- C07C 69/96 . Esters of carbonic or haloformic acids

**C07C 71/00**      **Esters of oxyacids of halogens**


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**C07C 2101/00**      **Systems containing only non-condensed rings**

- C07C 2101/02      .    with a three-membered ring
- C07C 2101/04      .    with a four-membered ring
- C07C 2101/06      .    with a five-membered ring
- C07C 2101/08      . .    The ring being saturated
- C07C 2101/10      . .    The ring being unsaturated
- C07C 2101/12      .    with a six-membered ring
- C07C 2101/14      . .    The ring being saturated
- C07C 2101/16      . .    The ring being unsaturated
- C07C 2101/18      .    with a ring being at least seven-membered
- C07C 2101/20      . .    The ring being twelve-membered

**C07C 2102/00**      **Systems containing two condensed rings**

- C07C 2102/02      .    The rings having only two atoms in common
- C07C 2102/04      . .    One of the condensed rings being a six-membered aromatic ring
- C07C 2102/06      . . .    The other ring being four-membered
- C07C 2102/08      . . .    The other ring being five-membered (e.g. indane)
- C07C 2102/10      . . .    The other ring being six-membered (e.d. tetraline)
- C07C 2102/12      . . .    The other ring being at least seven-membered
- C07C 2102/14      . .    All rings being cycloaliphatic
- C07C 2102/16      . . .    The ring system contains five carbon atoms
- C07C 2102/18      . . .    The ring system contains six carbon atoms
- C07C 2102/20      . . .    The ring system contains seven carbon atoms
- C07C 2102/22      . . .    The ring system contains eight carbon atoms (e.g. pentalene)
- C07C 2102/24      . . .    The ring system contains nine carbon atoms (e.g. perhydroindane)
- C07C 2102/26      . . .    The ring system contains ten carbon atoms
- C07C 2102/28      . . . .    Hydrogenated naphthalenes
- C07C 2102/30      . . . .    (Hydrogenated) azulenes
- C07C 2102/32      . . .    The ring system contains at least eleven carbon atoms
- C07C 2102/34      . . . .    (Hydrogenated) heptalenes
- C07C 2102/36      .    The rings having more than two atoms in common
- C07C 2102/38      . .    The bicyclo ring system contains five carbon atoms

- C07C 2102/40      ..      The bicyclo ring system contains six carbon atoms
- C07C 2102/42      ..      The bicyclo ring system contains seven carbon atoms
- C07C 2102/44      ..      The bicyclo ring system contains eight carbon atoms
- C07C 2102/46      ..      The bicyclo ring system contains nine carbon atoms
- C07C 2102/48      ..      The bicyclo ring system contains ten carbon atoms
- C07C 2102/50      .      Spiro compounds

### **C07C 2103/00      Systems containing at least three condensed rings**

- C07C 2103/02      .      Ortho- or ortho- and peri-condensed systems
- C07C 2103/04      ..      containing three rings
- C07C 2103/06      ...      containing at least one ring with less than six ring members
- C07C 2103/08      ....      containing three- or four-membered rings
- C07C 2103/10      ....      containing five-membered rings
- C07C 2103/12      .....      only one five-membered ring
- C07C 2103/14      .....      (Hydrogenated) benz[f]indenes
- C07C 2103/16      .....      (Hydrogenated) benz[e]indenes
- C07C 2103/18      .....      (Hydrogenated) fluorenes
- C07C 2103/20      .....      (Hydrogenated) acenaphthenes
- C07C 2103/22      ...      containing only six-membered rings
- C07C 2103/24      ....      (Hydrogenated) anthracenes
- C07C 2103/26      ....      (Hydrogenated) phenanthrenes
- C07C 2103/28      ....      (Hydrogenated) phenalenes
- C07C 2103/30      ...      containing seven-membered rings
- C07C 2103/32      ....      (Hydrogenated) dibenzocycloheptenes
- C07C 2103/34      ....      (Hydrogenated) benzoheptalenes
- C07C 2103/36      ...      containing eight-membered rings
- C07C 2103/38      ...      containing rings with at least nine members
- C07C 2103/40      ..      containing four condensed rings
- C07C 2103/42      ...      containing only six-membered rings
- C07C 2103/44      ....      (Hydrogenated) naphthacenes
- C07C 2103/46      .....      1,4,4a,5,5a,6,11,12a-Octahydronaphthacenes, e.g. tetracyclines
- C07C 2103/48      ....      (Hydrogenated) chrysenes
- C07C 2103/50      ....      (Hydrogenated) pyrenes
- C07C 2103/52      ..      containing five condensed rings
- C07C 2103/54      ..      containing more than five condensed rings
- C07C 2103/56      .      Ring systems containing bridged rings
- C07C 2103/58      ..      containing three rings
- C07C 2103/60      ...      containing at least one ring with less than six members

C07C 2103/62	....	containing three- or four-membered rings
C07C 2103/64	.....	having a tricyclo[2.2.1.0(2,6)]hept-structure
C07C 2103/66	....	containing five-membered rings
C07C 2103/68	.....	(Hydrogenated) dicyclopentadienes
C07C 2103/70	...	containing only six-membered rings
C07C 2103/72	....	(Hydrogenated) ethanonaphthalenes
C07C 2103/74	....	Adamantanes
C07C 2103/76	...	containing at least one ring which contains more than six ring members
C07C 2103/78	....	containing seven-membered rings
C07C 2103/80	....	containing eight-membered rings
C07C 2103/82	.....	having three condensed rings with in total fourteen carbon atoms and having a having a [5.4.3.0(1,8)] ring structure, e.g. pleuromutiline
C07C 2103/84	....	containing rings with more than eight members
C07C 2103/86	..	containing four rings
C07C 2103/88	...	(Hydrogenated) ethanoanthracenes
C07C 2103/90	..	containing more than four rings
C07C 2103/91	...	(Hydrogenated) polycyclopentadienes
C07C 2103/92	.	with a condensed ring system consisting of at least two mutually uncondensed aromatic ring systems, linked by an annular structure formed by carbon chains on non-adjacent positions of the aromatic system, e.g. cyclophanes
C07C 2103/93	.	Spiro compounds
C07C 2103/94	..	containing "free" spiro atoms
C07C 2103/95	..	containing "not free" spiro atoms
C07C 2103/96	...	containing at least one ring which contains less than six members
C07C 2103/97	....	containing five-membered rings
C07C 2103/98	...	containing at least one ring which contains more than six ring members
C07C 2103/99	....	containing eight-membered rings
C07C 2104/00		Fullerenes, e.g. <b>C60</b> (buckminsterfullerene) or <b>C70</b>

**Guidance heading:** Compounds containing carbon and nitrogen with or without hydrogen, halogens or oxygen (irradiation products of cholesterol or its derivatives [C07C 401/00](#); vitamin D derivatives, 9,10-seco cyclopenta[a]phenanthrene or analogues obtained by chemical preparation without irradiation [C07C 401/00](#); derivatives of cyclohexane or of a cyclohexene { or of cyclohexadiene}, having a side-chain containing an acyclic unsaturated part of at least four carbon atoms, this part being directly attached to the cyclohexane or cyclohexene { or cyclohexadiene} rings [C07C 403/00](#); protaglandins or derivatives thereof [C07C 405/00](#); peroxy compounds [C07C 407/00](#), [C07C 409/00](#))

**C07C 201/00** Preparation of esters of nitric or nitrous acid or of compounds containing nitro or nitroso groups bound to a carbon skeleton

- C07C 201/02 . Preparation of esters of nitric acid
- C07C 201/04 . Preparation of esters of nitrous acid
- C07C 201/06 . Preparation of nitro compounds
  - C07C 201/08 . . by substitution of hydrogen atoms by nitro groups
  - C07C 201/10 . . by substitution of functional groups by nitro groups
  - C07C 201/12 . . by reactions not involving the formation of nitro groups
  - C07C 201/14 . . by formation of nitro groups together with reactions not involving the formation of nitro groups
  - C07C 201/16 . . Separation; Purification; Stabilisation; Use of additives
- C07C 203/00 Esters of nitric or nitrous acid**
  - C07C 203/02 . Esters of nitric acid
    - C07C 203/04 . . having nitrate groups bound to acyclic carbon atoms
      - C07C 203/06 . . . Glycerol trinitrate
    - C07C 203/08 . . having nitrate groups bound to carbon atoms of rings other than six-membered aromatic rings
    - C07C 203/10 . . having nitrate groups bound to carbon atoms of six-membered aromatic rings
- C07C 205/00 Compounds containing nitro groups bound to a carbon skeleton**
  - C07C 205/01 . having nitro groups bound to acyclic carbon atoms
    - C07C 205/02 . . of a saturated carbon skeleton
    - C07C 205/03 . . of an unsaturated carbon skeleton
      - C07C 205/04 . . . containing six-membered aromatic rings
  - C07C 205/05 . having nitro groups bound to carbon atoms of rings other than six-membered aromatic rings
  - C07C 205/06 . having nitro groups bound to carbon atoms of six-membered aromatic rings
    - C07C 205/07 . the carbon skeleton being further substituted by halogen atoms
      - C07C 205/08 . . having nitro groups bound to acyclic carbon atoms
        - C07C 205/09 . . . of an unsaturated carbon skeleton
      - C07C 205/10 . . having nitro groups bound to carbon atoms of rings other than six-membered aromatic rings
        - C07C 205/11 . . having nitro groups bound to carbon atoms of six-membered aromatic rings
          - C07C 205/12 . . . the six-membered aromatic ring or a condensed ring system containing that ring being substituted by halogen atoms
      - C07C 205/13 . the carbon skeleton being further substituted by hydroxy groups
        - C07C 205/14 . . having nitro groups and hydroxy groups bound to acyclic carbon atoms

- C07C 205/15 . . . of a saturated carbon skeleton
- C07C 205/16 . . . of a carbon skeleton containing six-membered aromatic rings
- C07C 205/17 . . having nitro groups bound to acyclic carbon atoms and hydroxy groups bound to carbon atoms of six-membered aromatic rings
- C07C 205/18 . . having nitro groups or hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 205/19 . . having nitro groups bound to carbon atoms of six-membered aromatic rings and hydroxy groups bound to acyclic carbon atoms
- C07C 205/20 . . having nitro groups and hydroxy groups bound to carbon atoms of six-membered aromatic rings
- C07C 205/21 . . . having nitro groups and hydroxy groups bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 205/22 . . . . having one nitro groups bound to the ring
- C07C 205/23 . . . . having two nitro groups bound to the ring
- C07C 205/24 . . . . having three, and only three, nitro groups bound to the ring
- C07C 205/25 . . . having nitro groups bound to carbon atoms of six-membered aromatic rings being part of a condensed ring system
- C07C 205/26 . . and being further substituted by halogen atoms
  
- C07C 205/27 . the carbon skeleton being further substituted by etherified hydroxy groups
- C07C 205/28 . . having nitro groups and etherified hydroxy groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 205/29 . . . the carbon skeleton being saturated
- C07C 205/30 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a six-membered aromatic ring
- C07C 205/31 . . . the carbon skeleton containing six-membered aromatic rings
- C07C 205/32 . . having nitro groups bound to acyclic carbon atoms and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 205/33 . . having nitro groups or etherified hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton
- C07C 205/34 . . having nitro groups bound to carbon atoms of six-membered aromatic rings and etherified hydroxy groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 205/35 . . having nitro groups and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 205/36 . . . to carbon atoms of the same non-condensed six-membered aromatic ring or to carbon atoms of six-membered aromatic rings being part of the same condensed ring system
- C07C 205/37 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to an acyclic carbon atom
- C07C 205/38 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a six-membered aromatic ring, e.g. nitrodiphenyl ethers
  
- C07C 205/39 . the carbon skeleton being further substituted by esterified hydroxy groups
- C07C 205/40 . . having nitro groups and esterified hydroxy groups bound to acyclic carbon atoms of the carbon skeleton

- C07C 205/41      . .      having nitro groups or esterified hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton
- C07C 205/42      . .      having nitro groups or esterified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 205/43      . . .      to carbon atoms of the same non-condensed six-membered aromatic ring or to carbon atoms of six-membered aromatic rings being part of the same condensed ring system
- C07C 205/44      .      the carbon skeleton being further substituted by -CHO groups
- C07C 205/45      .      the carbon skeleton being further substituted by at least one doubly-bound oxygen atom, not being part of a -CHO group
- C07C 205/46      . .      the carbon skeleton containing carbon atoms of quinone rings
- C07C 205/47      . . .      Anthraquinones containing nitro groups
- C07C 205/48      . . . .      the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 205/49      .      the carbon skeleton being further substituted by carboxyl groups
- C07C 205/50      . .      having nitro groups and carboxyl groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 205/51      . . .      the carbon skeleton being saturated
- C07C 205/52      . . . .      Nitro-acetic acids
- C07C 205/53      . . .      the carbon skeleton containing six-membered aromatic rings
- C07C 205/54      . .      having nitro groups bound to acyclic carbon atoms and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 205/55      . .      having nitro groups or carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton
- C07C 205/56      . .      having nitro groups bound to carbon atoms of six-membered aromatic rings and carboxyl groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 205/57      . .      having nitro groups and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 205/58      . . .      the carbon skeleton being further substituted by halogen atoms
- C07C 205/59      . . .      the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 205/60      . . . .      in ortho-position to the carboxyl group, e.g. nitro-salicylic acids
- C07C 205/61      . . .      the carbon skeleton being further substituted by doubly-bound oxygen atoms

**C07C 207/00      Compounds containing nitroso groups bound to a carbon skeleton**

- C07C 207/02      .      the carbon skeleton not being further substituted
- C07C 207/04      .      the carbon skeleton being further substituted by singly-bound oxygen atoms

**C07C 209/00      Preparation of compounds containing amino groups bound to a carbon skeleton**

- C07C 209/02      .      by substitution of hydrogen atoms by amino groups

- C07C 209/04 . by substitution of functional groups by amino groups
- C07C 209/06 .. by substitution of halogen atoms
- C07C 209/08 ... with formation of amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings
- C07C 209/10 ... with formation of amino groups bound to carbon atoms of six-membered aromatic rings or from amines having nitrogen atoms bound to carbon atoms of six-membered aromatic rings
- C07C 209/12 ... with formation of quaternary ammonium compounds
- C07C 209/14 .. by substitution of hydroxy groups or of etherified or esterified hydroxy groups
- C07C 209/16 ... with formation of amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings
- C07C 209/18 ... with formation of amino groups bound to carbon atoms of six-membered aromatic rings or from amines having nitrogen atoms bound to carbon atoms of six-membered aromatic rings
- C07C 209/20 ... with formation of quaternary ammonium compounds
- C07C 209/22 .. by substitution of other functional groups
- C07C 209/24 . by reductive alkylation of ammonia, amines or compounds having groups reducible to amino groups, with carbonyl compounds
- C07C 209/26 .. by reduction with hydrogen
- C07C 209/28 .. by reduction with other reducing agents
- C07C 209/30 . by reduction of nitrogen-to-oxygen or nitrogen-to-nitrogen bonds
- C07C 209/32 .. by reduction of nitro groups
- C07C 209/325 ... {reduction by other means than indicated in [C07C 209/34](#) or [C07C 209/36](#)}
- C07C 209/34 ... by reduction of nitro groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings {in presence of hydrogen-containing gases and a catalyst}
- C07C 209/36 ... by reduction of nitro groups bound to carbon atoms of six-membered aromatic rings {in presence of hydrogen-containing gases and a catalyst}
- C07C 209/365 ... {by reduction with preservation of halogen-atoms in compounds containing nitro groups and halogen atoms bound to the same carbon skeleton}
- C07C 209/38 .. by reduction of nitroso groups
- C07C 209/40 .. by reduction of hydroxylamino or oxyimino groups
- C07C 209/42 .. by reduction of nitrogen-to-nitrogen bonds
- C07C 209/44 . by reduction of carboxylic acids or esters thereof in presence of ammonia or amines, or by reduction of nitriles, carboxylic acid amides, imines or imino-ethers
- C07C 209/46 .. by reduction of carboxylic acids or esters thereof in presence of ammonia or amines
- C07C 209/48 .. by reduction of nitriles
- C07C 209/50 .. by reduction of carboxylic acid amides
- C07C 209/52 .. by reduction of imines or imino-ethers ([C07C 209/24](#) takes precedence)
- C07C 209/54 . by rearrangement reactions

- C07C 209/56 . . from carboxylic acids involving a Hofmann, Curtius, Schmidt, or Lossen-type rearrangement
- C07C 209/58 . . from or via amides
- C07C 209/60 . by condensation or addition reactions, e.g. Mannich reaction, addition of ammonia or amines to alkenes or to alkynes or addition of compounds containing an active hydrogen atom to Schiff's bases, quinone imines, or aziranes
- C07C 209/62 . by cleaving carbon-to-nitrogen, sulfur-to-nitrogen, or phosphorus-to-nitrogen bonds, e.g. hydrolysis of amides, N-dealkylation of amines or quaternary ammonium compounds ([C07C 209/24 takes precedence](#))
- C07C 209/64 . by disproportionation
- C07C 209/66 . from or via metallo-organic compounds
- C07C 209/68 . from amines, by reactions not involving amino groups, e.g. reduction of unsaturated amines, aromatisation, or substitution of the carbon skeleton
- C07C 209/70 . . by reduction of unsaturated amines
- C07C 209/72 . . . by reduction of six-membered aromatic rings
- C07C 209/74 . . by halogenation, hydrohalogenation, dehalogenation, or dehydrohalogenation
- C07C 209/76 . . by nitration
- C07C 209/78 . . from carbonyl compounds, e.g. from formaldehyde, and amines having amino groups bound to carbon atoms of six-membered aromatic rings, with formation of methylene-diaryl amines
- C07C 209/80 . by photochemical reactions; by using free radicals
- C07C 209/82 . Purification; Separation; Stabilisation; Use of additives
- C07C 209/84 . . Purification
- C07C 209/86 . . Separation
- C07C 209/88 . . . Separation of optical isomers
- C07C 209/90 . . Stabilisation; Use of additives

## **C07C 211/00      Compounds containing amino groups bound to a carbon skeleton**

- C07C 211/01 . having amino groups bound to acyclic carbon atoms
- C07C 211/02 . . of an acyclic saturated carbon skeleton
- C07C 211/03 . . . Monoamines
- C07C 211/04 . . . . Mono-, di- or tri-methylamine
- C07C 211/05 . . . . Mono-, di- or tri-ethylamine
- C07C 211/06 . . . . containing only n- or iso-propyl groups
- C07C 211/07 . . . . containing one, two or three alkyl groups, each having the same number of carbon atoms in excess of three
- C07C 211/08 . . . . containing alkyl groups having a different number of carbon atoms
- C07C 211/09 . . . Diamines

C07C 211/10	....	Diaminoethanes
C07C 211/11	....	Diaminopropanes
C07C 211/12	....	1,6-Diaminohexanes
C07C 211/13	...	Amines containing three or more amino groups bound to the carbon skeleton
C07C 211/14	...	Amines containing amino groups bound to at least two aminoalkyl groups, e.g. diethylenetriamines
C07C 211/15	...	the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
C07C 211/16	..	of a saturated carbon skeleton containing rings other than six-membered aromatic rings
C07C 211/17	...	containing only non-condensed rings
C07C 211/18	...	containing at least two amino groups bound to the carbon skeleton
C07C 211/19	...	containing condensed ring systems
C07C 211/20	..	of an acyclic unsaturated carbon skeleton
C07C 211/21	...	Monoamines
C07C 211/22	...	containing at least two amino groups bound to the carbon skeleton
C07C 211/23	...	the carbon skeleton containing carbon-to-carbon triple bonds
C07C 211/24	...	the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
C07C 211/25	..	of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
C07C 211/26	..	of an unsaturated carbon skeleton containing at least one six-membered aromatic ring
C07C 211/27	...	having amino groups linked to the six-membered aromatic ring by saturated carbon chains
C07C 211/28	...	having amino groups linked to the six-membered aromatic ring by unsaturated carbon chains
C07C 211/29	...	the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
C07C 211/30	...	the six-membered aromatic ring being part of a condensed ring system formed by two rings
C07C 211/31	...	the six-membered aromatic ring being part of a condensed ring system formed by at least three rings
C07C 211/32	....	containing dibenzocycloheptane or dibenzocycloheptene ring systems or condensed derivatives thereof
C07C 211/33	.	having amino groups bound to carbon atoms of rings other than six-membered aromatic rings
C07C 211/34	..	of a saturated carbon skeleton
C07C 211/35	...	containing only non-condensed rings
C07C 211/36	...	containing at least two amino groups bound to the carbon skeleton
C07C 211/37	...	being further substituted by halogen atoms or by nitro or nitroso groups
C07C 211/38	...	containing condensed ring systems
C07C 211/39	..	of an unsaturated carbon skeleton

- C07C 211/40 . . . containing only non-condensed rings
- C07C 211/41 . . . containing condensed ring systems
- C07C 211/42 . . . . with six-membered aromatic rings being part of the condensed ring systems
- C07C 211/43 . having amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 211/44 . . having amino groups bound to only one six-membered aromatic ring
- C07C 211/45 . . . Monoamines
- C07C 211/46 . . . . Aniline
- C07C 211/47 . . . . Toluidines; Homologues thereof
- C07C 211/48 . . . . N-alkylated amines
- C07C 211/49 . . . having at least two amino groups bound to the carbon skeleton
- C07C 211/50 . . . . with at least two amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 211/51 . . . . . Phenylenediamines
- C07C 211/52 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
- C07C 211/53 . . . having the nitrogen atom of at least one of the amino groups further bound to a hydrocarbon radical substituted by amino groups
- C07C 211/54 . . having amino groups bound to two or three six-membered aromatic rings
- C07C 211/55 . . . Diphenylamines
- C07C 211/56 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
- C07C 211/57 . . having amino groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems of the carbon skeleton
- C07C 211/58 . . . Naphthylamines; N-substituted derivatives thereof
- C07C 211/59 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
- C07C 211/60 . . . containing a ring other than a six-membered aromatic ring forming part of at least one of the condensed ring systems
- C07C 211/61 . . . with at least one of the condensed ring systems formed by three or more rings
- C07C 211/62 . Quaternary ammonium compounds
- C07C 211/63 . . having quaternised nitrogen atoms bound to acyclic carbon atoms
- C07C 211/64 . . having quaternised nitrogen atoms bound to carbon atoms of six-membered aromatic rings
- C07C 211/65 . Metal complexes of amines
- C07C 213/00 Preparation of compounds containing amino and hydroxy, amino and etherified hydroxy or amino and esterified hydroxy groups bound to the same carbon skeleton**
- C07C 213/02 . by reactions involving the formation of amino groups from compounds containing hydroxy groups or etherified or esterified hydroxy groups

- C07C 213/04 . by reaction of ammonia or amines with olefin oxides or halohydrins
- C07C 213/06 . from hydroxy amines by reactions involving the etherification or esterification of hydroxy groups
- C07C 213/08 . by reactions not involving the formation of amino groups, hydroxy groups or etherified or esterified hydroxy groups
- C07C 213/10 . Separation; Purification; Stabilisation; Use of additives
- C07C 215/00      Compounds containing amino and hydroxy groups bound to the same carbon skeleton**
- C07C 215/02 . having hydroxy groups and amino groups bound to acyclic carbon atoms of the same carbon skeleton
- C07C 215/04 .. the carbon skeleton being saturated
- C07C 215/06 ... and acyclic
- C07C 215/08 .... with only one hydroxy group and one amino group bound to the carbon skeleton
- C07C 215/10 .... with one amino group and at least two hydroxy groups bound to the carbon skeleton
- C07C 215/12 .... the nitrogen atom of the amino group being further bound to hydrocarbon groups substituted by hydroxy groups
- C07C 215/14 .... the nitrogen atom of the amino group being further bound to hydrocarbon groups substituted by amino groups
- C07C 215/16 .... the nitrogen atom of the amino group being further bound to carbon atoms of six-membered aromatic rings
- C07C 215/18 .... with hydroxy groups and at least two amino groups bound to the carbon skeleton
- C07C 215/20 ... the carbon skeleton being saturated and containing rings
- C07C 215/22 .. the carbon skeleton being unsaturated
- C07C 215/24 ... and acyclic
- C07C 215/26 ... and containing rings other than six-membered aromatic rings
- C07C 215/28 ... and containing six-membered aromatic rings
- C07C 215/30 .... containing hydroxy groups and carbon atoms of six-membered aromatic rings bound to the same carbon atom of the carbon skeleton
- C07C 215/32 ..... containing hydroxy groups and carbon atoms of two six-membered aromatic rings bound to the same carbon atom of the carbon skeleton
- C07C 215/34 .... containing hydroxy groups and carbon atoms of six-membered aromatic rings bound to the same carbon atom of the carbon skeleton and at least one hydroxy group bound to another carbon atom of the carbon skeleton
- C07C 215/36 ..... 1-Aryl-2-amino-1,3-propane diols
- C07C 215/38 .... with rings other than six-membered aromatic rings being part of the carbon skeleton
- C07C 215/40 .. with quaternised nitrogen atoms bound to carbon atoms of the carbon skeleton

- C07C 215/42 . having amino groups or hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 215/44 . . bound to carbon atoms of the same ring or condensed ring system
- C07C 215/46 . having hydroxy groups bound to carbon atoms of at least one six-membered aromatic ring and amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 215/48 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains not further substituted by hydroxy groups
- C07C 215/50 . . . with amino groups and the six-membered aromatic ring, or the condensed ring system containing that ring, bound to the same carbon atom of the carbon chain
- C07C 215/52 . . . linked by carbon chains having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
- C07C 215/54 . . . linked by carbon chains having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
- C07C 215/56 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains further substituted by hydroxy groups
- C07C 215/58 . . . with hydroxy groups and the six-membered aromatic ring, or the condensed ring system containing that ring, bound to the same carbon atom of the carbon chain
- C07C 215/60 . . . . the chain having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
- C07C 215/62 . . . . the chain having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
- C07C 215/64 . . with rings other than six-membered aromatic rings being part of the carbon skeleton
- C07C 215/66 . . with quaternised amino groups bound to the carbon skeleton
- C07C 215/68 . having amino groups bound to carbon atoms of six-membered aromatic rings and hydroxy groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 215/70 . . with rings other than six-membered aromatic rings being part of the carbon skeleton
- C07C 215/72 . . with quaternised amino groups bound to the carbon skeleton
- C07C 215/74 . having hydroxy groups and amino groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton
- C07C 215/76 . . of the same non-condensed six-membered aromatic ring
- C07C 215/78 . . . containing at least two hydroxy groups bound to the carbon skeleton
- C07C 215/80 . . . containing at least two amino groups bound to the carbon skeleton
- C07C 215/82 . . . having the nitrogen atom of at least one of the amino groups further bound to a carbon atom of another six-membered aromatic ring

- C07C 215/84      ..      having amino groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems
- C07C 215/86      ...      being formed by two rings
- C07C 215/88      ...      being formed by at least three rings
- C07C 215/90      ..      with quaternised amino groups bound to the carbon skeleton
  
- C07C 217/00      **Compounds containing amino and etherified hydroxy groups bound to the same carbon skeleton****
  
- C07C 217/02      .      having etherified hydroxy groups and amino groups bound to acyclic carbon atoms of the same carbon skeleton
- C07C 217/04      ..      the carbon skeleton being acyclic and saturated
- C07C 217/06      ...      having only one etherified hydroxy group and one amino group bound to the carbon skeleton, which is not further substituted
- C07C 217/08      ....      the oxygen atom of the etherified hydroxy group being further bound to an acyclic carbon atom
- C07C 217/10      .....      to an acyclic carbon atom of a hydrocarbon radical containing six-membered aromatic rings
- C07C 217/12      ....      the oxygen atom of the etherified hydroxy group being further bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 217/14      ....      the oxygen atom of the etherified hydroxy group being further bound to a carbon atom of a six-membered aromatic ring
- C07C 217/16      .....      the six-membered aromatic ring or condensed ring system containing that ring not being further substituted
- C07C 217/18      .....      the six-membered aromatic ring or condensed ring system containing that ring being further substituted
- C07C 217/20      .....      by halogen atoms, by trihalomethyl, nitro or nitroso groups, or by singly-bound oxygen atoms
- C07C 217/22      .....      by carbon atoms having at least two bonds to oxygen atoms
- C07C 217/24      .....      the six-membered aromatic ring being part of a condensed ring system containing rings other than six-membered aromatic rings
- C07C 217/26      ...      having only one etherified hydroxy group and one amino group bound to the carbon skeleton, which is further substituted by halogen atoms or by nitro or nitroso groups
- C07C 217/28      ...      having one amino group and at least two singly-bound oxygen atoms, with at least one being part of an etherified hydroxy group, bound to the carbon skeleton, e.g. ethers of polyhydroxy amines
- C07C 217/30      ....      having the oxygen atom of at least one of the etherified hydroxy groups further bound to a carbon atom of a six-membered aromatic ring
- C07C 217/32      .....      the six-membered aromatic ring or condensed ring system containing that ring being further substituted
- C07C 217/34      .....      by halogen atoms, by trihalomethyl, nitro or nitroso groups, or by singly-bound oxygen atoms
- C07C 217/36      .....      by carbon atoms having at least two bonds to oxygen atoms
- C07C 217/38      .....      the six-membered aromatic ring being part of a condensed ring system containing rings other than six-membered aromatic rings

- C07C 217/40 . . . . having at least two singly-bound oxygen atoms, with at least one being part of an etherified hydroxy group, bound to the same carbon atom of the carbon skeleton, e.g. amino-ketals, ortho esters
- C07C 217/42 . . . having etherified hydroxy groups and at least two amino groups bound to the carbon skeleton
- C07C 217/44 . . the carbon skeleton being saturated and containing rings
- C07C 217/46 . . the carbon skeleton being acyclic and unsaturated
- C07C 217/48 . . the carbon skeleton being unsaturated and containing rings
- C07C 217/50 . . Ethers of hydroxy amines of undetermined structure, e.g. obtained by reactions of epoxides with hydroxy amines
  
- C07C 217/52 . having etherified hydroxy groups or amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
  
- C07C 217/54 . having etherified hydroxy groups bound to carbon atoms of at least one six-membered aromatic ring and amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
  
- C07C 217/56 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains not further substituted by singly-bound oxygen atoms
  
- C07C 217/58 . . . with amino groups and the six-membered aromatic ring, or the condensed ring system containing that ring, bound to the same carbon atom of the carbon chain
  
- C07C 217/60 . . . linked by carbon chains having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
  
- C07C 217/62 . . . linked by carbon chains having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
  
- C07C 217/64 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains further substituted by singly-bound oxygen atoms
  
- C07C 217/66 . . . with singly-bound oxygen atoms and six-membered aromatic rings bound to the same carbon atom of the carbon chain
  
- C07C 217/68 . . . . with singly-bound oxygen atoms, six-membered aromatic rings and amino groups bound to the same carbon atom of the carbon chain
  
- C07C 217/70 . . . . linked by carbon chains having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
  
- C07C 217/72 . . . . linked by carbon chains having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring
  
- C07C 217/74 . . with rings other than six-membered aromatic rings being part of the carbon skeleton
  
- C07C 217/76 . having amino groups bound to carbon atoms of six-membered aromatic rings and etherified hydroxy groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton

- C07C 217/78 . having amino groups and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton
- C07C 217/80 .. having amino groups and etherified hydroxy groups bound to carbon atoms of non-condensed six-membered aromatic rings
- C07C 217/82 ... of the same non-condensed six-membered aromatic ring
- C07C 217/84 .... the oxygen atom of at least one of the etherified hydroxy groups being further bound to an acyclic carbon atom
- C07C 217/86 ..... to an acyclic carbon atom of a hydrocarbon radical containing six-membered aromatic rings
- C07C 217/88 .... the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 217/90 .... the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a six-membered aromatic ring, e.g. amino-diphenylethers
- C07C 217/92 .... the nitrogen atom of at least one of the amino groups being further bound to a carbon atom of a six-membered aromatic ring
- C07C 217/94 .. having amino groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton
  
- C07C 219/00 Compounds containing amino and esterified hydroxy groups bound to the same carbon skeleton**
- C07C 219/02 . having esterified hydroxy groups and amino groups bound to acyclic carbon atoms of the same carbon skeleton
- C07C 219/04 .. the carbon skeleton being acyclic and saturated
- C07C 219/06 ... having the hydroxy groups esterified by carboxylic acids having the esterifying carboxyl groups bound to hydrogen atoms or to acyclic carbon atoms of an acyclic saturated carbon skeleton
- C07C 219/08 ... having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to an acyclic carbon atom of an acyclic unsaturated carbon skeleton
- C07C 219/10 ... having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to an acyclic carbon atom of a carbon skeleton containing rings
- C07C 219/12 ... having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 219/14 ... having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to a carbon atom of a six-membered aromatic ring
- C07C 219/16 ... having at least one of the hydroxy groups esterified by an inorganic acid or a derivative thereof
- C07C 219/18 .. the carbon skeleton being saturated and containing rings
- C07C 219/20 .. the carbon skeleton being unsaturated
- C07C 219/22 ... and containing six-membered aromatic rings

- C07C 219/24
  - . having esterified hydroxy groups or amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 219/26
  - . having esterified hydroxy groups bound to carbon atoms of at least one six-membered aromatic ring and amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 219/28
  - . . having amino groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 219/30
  - . . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains further substituted by singly-bound oxygen atoms
- C07C 219/32
  - . having amino groups bound to carbon atoms of six-membered aromatic rings and esterified hydroxy groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 219/34
  - . having amino groups and esterified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton
- C07C 221/00
 

**Preparation of compounds containing amino groups and doubly-bound oxygen atoms bound to the same carbon skeleton**
- C07C 223/00
 

**Compounds containing amino and -CHO groups bound to the same carbon skeleton**
- C07C 223/02
  - . having amino groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 223/04
  - . having amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton
- C07C 223/06
  - . having amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 225/00
 

**Compounds containing amino groups and doubly-bound oxygen atoms bound to the same carbon skeleton, at least one of the doubly-bound oxygen atoms not being part of a -CHO group, e.g. amino ketones**
- C07C 225/02
  - . having amino groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 225/04
  - . . the carbon skeleton being saturated
- C07C 225/06
  - . . . and acyclic
- C07C 225/08
  - . . . and containing rings
- C07C 225/10
  - . . . . with doubly-bound oxygen atoms bound to carbon atoms not being part of rings
- C07C 225/12
  - . . . . with doubly-bound oxygen atoms bound to carbon atoms being part of rings
- C07C 225/14
  - . . the carbon skeleton being unsaturated
- C07C 225/16
  - . . . and containing six-membered aromatic rings

- C07C 225/18 . . . . the carbon skeleton containing also rings other than six-membered aromatic rings
- C07C 225/20 . having amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton
- C07C 225/22 . having amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
- C07C 225/24 . the carbon skeleton containing carbon atoms of quinone rings
- C07C 225/26 . . having amino groups bound to carbon atoms of quinone rings or of condensed ring systems containing quinone rings
- C07C 225/28 . . . of non-condensed quinone rings
- C07C 225/30 . . . of condensed quinone ring systems formed by two rings
- C07C 225/32 . . . of condensed quinone ring systems formed by at least three rings
- C07C 225/34 . . . . Amino anthraquinones
- C07C 225/36 . . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 227/00 Preparation of compounds containing amino and carboxyl groups bound to the same carbon skeleton**
- C07C 227/02 . Formation of carboxyl groups in compounds containing amino groups, e.g. by oxidation of amino alcohols
- C07C 227/04 . Formation of amino groups in compounds containing carboxyl groups
- C07C 227/06 . . by addition or substitution reactions, without increasing the number of carbon atoms in the carbon skeleton of the acid
- C07C 227/08 . . . by reaction of ammonia or amines with acids containing functional groups
- C07C 227/10 . . with simultaneously increasing the number of carbon atoms in the carbon skeleton
- C07C 227/12 . Formation of amino and carboxyl groups
- C07C 227/14 . from compounds containing already amino and carboxyl groups or derivatives thereof
- C07C 227/16 . . by reactions not involving the amino or carboxyl groups
- C07C 227/18 . . by reactions involving amino or carboxyl groups, e.g. hydrolysis of esters or amides, by formation of halides, salts or esters
- C07C 227/20 . . . by hydrolysis of N-acylated amino-acids or derivatives thereof, e.g. hydrolysis of carbamates
- C07C 227/22 . from lactams, cyclic ketones or cyclic oximes, e.g. by reactions involving Beckmann rearrangement
- C07C 227/24 . from hydantoins
- C07C 227/26 . from compounds containing carboxyl groups by reaction with HCN, or a salt thereof, and amines, or from aminonitriles

- C07C 227/28 . from natural products
- C07C 227/30 . Preparation of optical isomers
- C07C 227/32 . . by stereospecific synthesis
- C07C 227/34 . . by separation of optical isomers
- C07C 227/36 . Racemisation of optical isomers
- C07C 227/38 . Separation; Purification; Stabilisation; Use of additives ([separation of optical isomers C07C 227/34](#))
- C07C 227/40 . . Separation; Purification
- C07C 227/42 . . . Crystallisation
- C07C 227/44 . . Stabilisation; Use of additives
- C07C 229/00      Compounds containing amino and carboxyl groups bound to the same carbon skeleton**
- C07C 229/02 . having amino and carboxyl groups bound to acyclic carbon atoms of the same carbon skeleton
- C07C 229/04 . . the carbon skeleton being acyclic and saturated
- C07C 229/06 . . . having only one amino and one carboxyl group bound to the carbon skeleton
- C07C 229/08 . . . . the nitrogen atom of the amino group being further bound to hydrogen atoms
- C07C 229/10 . . . . the nitrogen atom of the amino group being further bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings
- C07C 229/12 . . . . . to carbon atoms of acyclic carbon skeletons
- C07C 229/14 . . . . . to carbon atoms of carbon skeletons containing rings
- C07C 229/16 . . . . . to carbon atoms of hydrocarbon radicals substituted by amino or carboxyl groups, e.g. ethylenediamine-tetra-acetic acid, iminodiacetic acids
- C07C 229/18 . . . . the nitrogen atom of the amino group being further bound to carbon atoms of six-membered aromatic rings
- C07C 229/20 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups
- C07C 229/22 . . . the carbon skeleton being further substituted by oxygen atoms
- C07C 229/24 . . . having more than one carboxyl group bound to the carbon skeleton, e.g. aspartic acid
- C07C 229/26 . . . having more than one amino group bound to the carbon skeleton, e.g. lysine
- C07C 229/28 . . the carbon skeleton being saturated and containing rings
- C07C 229/30 . . the carbon skeleton being acyclic and unsaturated
- C07C 229/32 . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 229/34 . . the carbon skeleton containing six-membered aromatic rings
- C07C 229/36 . . . with at least one amino group and one carboxyl group bound to the same carbon atom of the carbon skeleton

- C07C 229/38 . having amino groups bound to acyclic carbon atoms and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton
- C07C 229/40 . having amino groups bound to carbon atoms of at least one six-membered aromatic ring and carboxyl groups bound to acyclic carbon atoms of the same carbon skeleton
- C07C 229/42 . . with carboxyl groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by saturated carbon chains
- C07C 229/44 . . with carboxyl groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by unsaturated carbon chains
- C07C 229/46 . having amino or carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton
- C07C 229/48 . . with amino groups and carboxyl groups bound to carbon atoms of the same non-condensed ring
- C07C 229/50 . . with amino groups and carboxyl groups bound to carbon atoms being part of the same condensed ring system
- C07C 229/52 . having amino and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton
- C07C 229/54 . . with amino and carboxyl groups bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 229/56 . . . with amino and carboxyl groups bound in ortho-position
- C07C 229/58 . . . . having the nitrogen atom of at least one of the amino groups further bound to a carbon atom of a six-membered aromatic ring, e.g. N-phenyl-anthranilic acids
- C07C 229/60 . . . with amino and carboxyl groups bound in meta- or para- positions
- C07C 229/62 . . . with amino groups and at least two carboxyl groups bound to carbon atoms of the same six-membered aromatic ring
- C07C 229/64 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 229/66 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms
- C07C 229/68 . . with amino and carboxyl groups bound to carbon atoms of six-membered aromatic rings being part of the same condensed ring system
- C07C 229/70 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 229/72 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms
- C07C 229/74 . . . . the condensed ring system being formed by at least three rings, e.g. amino anthraquinone carboxylic acids
- C07C 229/76 . Metal complexes of amino carboxylic acids

#### **C07C 231/00 Preparation of carboxylic acid amides**

- C07C 231/02 . from carboxylic acids or from esters, anhydrides, or halides thereof by reaction with ammonia or amines
- C07C 231/04 . from ketenes by reaction with ammonia or amines

- C07C 231/06 . from nitriles by transformation of cyano groups into carboxamide groups
- C07C 231/065 .. {By hydration using metals or metallic ions as catalyst}
- C07C 231/08 . from amides by reaction at nitrogen atoms of carboxamide groups
- C07C 231/10 . from compounds not provided for in groups [C07C 231/02](#) to [C07C 231/08](#)
- C07C 231/12 . by reactions not involving the formation of carboxamide groups
- C07C 231/14 . by formation of carboxamide groups together with reactions not involving the carboxamide groups
- C07C 231/16 . Preparation of optical isomers
- C07C 231/18 .. by stereospecific synthesis
- C07C 231/20 .. by separation of optical isomers
- C07C 231/22 . Separation; Purification; Stabilisation; Use of additives ([separation of optical isomers C07C 231/20](#))
- C07C 231/24 .. Separation; Purification
- C07C 233/00 Carboxylic acid amides**
- C07C 233/01 . having carbon atoms of carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 233/02 .. having nitrogen atoms of carboxamide groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals
- C07C 233/03 ... with carbon atoms of carboxamide groups bound to hydrogen atoms
- C07C 233/04 ... with carbon atoms of carboxamide groups bound to acyclic carbon atoms of an acyclic saturated carbon skeleton
- C07C 233/05 .... having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 233/06 .... having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 233/07 .... having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 233/08 ... with carbon atoms of carboxamide groups bound to acyclic carbon atoms of a saturated carbon skeleton containing rings
- C07C 233/09 ... with carbon atoms of carboxamide groups bound to carbon atoms of an acyclic unsaturated carbon skeleton
- C07C 233/10 ... with carbon atoms of carboxamide groups bound to carbon atoms of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
- C07C 233/11 ... with carbon atoms of carboxamide groups bound to carbon atoms of an unsaturated carbon skeleton containing six-membered aromatic rings

- C07C 233/12      ..      having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by halogen atoms or by nitro or nitroso groups
- C07C 233/13      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
- C07C 233/14      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring
- C07C 233/15      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring
- C07C 233/16      ..      having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 233/17      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
- C07C 233/18      ....      having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton
- C07C 233/19      ....      having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings
- C07C 233/20      ....      having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton
- C07C 233/21      ....      having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
- C07C 233/22      ....      having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings
- C07C 233/23      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring
- C07C 233/24      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring
- C07C 233/25      ....      having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton
- C07C 233/26      ....      having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings
- C07C 233/27      ....      having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton
- C07C 233/28      ....      having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
- C07C 233/29      ....      having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings
- C07C 233/30      ..      having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by doubly-bound oxygen atoms
- C07C 233/31      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
- C07C 233/32      ...      with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring

C07C 233/33	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring
C07C 233/34	..	having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by amino groups
C07C 233/35	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
C07C 233/36	....	having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton
C07C 233/37	....	having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings
C07C 233/38	....	having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton
C07C 233/39	....	having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
C07C 233/40	....	having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings
C07C 233/41	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring
C07C 233/42	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring
C07C 233/43	....	having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of a saturated carbon skeleton
C07C 233/44	....	having the carbon atom of the carboxamide group bound to a carbon atom of an unsaturated carbon skeleton
C07C 233/45	..	having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by carboxyl groups
C07C 233/46	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
C07C 233/47	....	having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton
C07C 233/48	....	having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings
C07C 233/49	....	having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton
C07C 233/50	....	having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
C07C 233/51	....	having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings
C07C 233/52	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring
C07C 233/53	...	with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring

- C07C 233/54 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of a saturated carbon skeleton
- C07C 233/55 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an unsaturated carbon skeleton
- C07C 233/56 . . having carbon atoms of carboxamide groups bound to carbon atoms of carboxyl groups, e.g. oxamides
- C07C 233/57 . having carbon atoms of carboxamide groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 233/58 . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals
- C07C 233/59 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by halogen atoms or by nitro or nitroso groups
- C07C 233/60 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 233/61 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by doubly-bound oxygen atoms
- C07C 233/62 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by amino groups
- C07C 233/63 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by carboxyl groups
- C07C 233/64 . having carbon atoms of carboxamide groups bound to carbon atoms of six-membered aromatic rings
- C07C 233/65 . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals
- C07C 233/66 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by halogen atoms or by nitro or nitroso groups
- C07C 233/67 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 233/68 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
- C07C 233/69 . . . . of an acyclic saturated carbon skeleton
- C07C 233/70 . . . . of a saturated carbon skeleton containing rings
- C07C 233/71 . . . . of an acyclic unsaturated carbon skeleton
- C07C 233/72 . . . . of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
- C07C 233/73 . . . . of a carbon skeleton containing six-membered aromatic rings
- C07C 233/74 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring
- C07C 233/75 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring
- C07C 233/76 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by doubly-bound oxygen atoms

- C07C 233/77 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by amino groups
- C07C 233/78 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
- C07C 233/79 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring
- C07C 233/80 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring
- C07C 233/81 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by carboxyl groups
- C07C 233/82 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom
- C07C 233/83 . . . . of an acyclic saturated carbon skeleton
- C07C 233/84 . . . . of a saturated carbon skeleton containing rings
- C07C 233/85 . . . . of an acyclic unsaturated carbon skeleton
- C07C 233/86 . . . . of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
- C07C 233/87 . . . . of a carbon skeleton containing six-membered aromatic rings
- C07C 233/88 . having nitrogen atoms of carboxamide groups bound to an acyclic carbon atom and to a carbon atom of a six-membered aromatic ring wherein at least one ortho-hydrogen atom has been replaced
- C07C 233/89 . having nitrogen atoms of carboxamide groups quaternised
- C07C 233/90 . having nitrogen atoms of carboxamide groups further acylated
- C07C 233/91 . . with carbon atoms of the carboxamide groups bound to acyclic carbon atoms
- C07C 233/92 . . with at least one carbon atom of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 235/00 Carboxylic acid amides, the carbon skeleton of the acid part being further substituted by oxygen atoms**
- C07C 235/02 . having carbon atoms of carboxamide groups bound to acyclic carbon atoms and singly-bound oxygen atoms bound to the same carbon skeleton
- C07C 235/04 . . the carbon skeleton being acyclic and saturated
- C07C 235/06 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 235/08 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 235/10 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 235/12 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups

- C07C 235/14 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 235/16 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 235/18 . . . having at least one of the singly-bound oxygen atoms further bound to a carbon atom of a six-membered aromatic ring, e.g. phenoxyacetamides
- C07C 235/20 . . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 235/22 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 235/24 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 235/26 . . the carbon skeleton being saturated and containing rings
- C07C 235/28 . . the carbon skeleton being acyclic and unsaturated
- C07C 235/30 . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 235/32 . . the carbon skeleton containing six-membered aromatic rings
- C07C 235/34 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 235/36 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 235/38 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
  
- C07C 235/40 . having carbon atoms of carboxamide groups bound to carbon atoms of rings other than six-membered aromatic rings and singly-bound oxygen atoms bound to the same carbon skeleton
  
- C07C 235/42 . having carbon atoms of carboxamide groups bound to carbon atoms of six-membered aromatic rings and singly-bound oxygen atoms bound to the same carbon skeleton
- C07C 235/44 . . with carbon atoms of carboxamide groups and singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 235/46 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 235/48 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 235/50 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 235/52 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups
- C07C 235/54 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 235/56 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring

- C07C 235/58 . . . with carbon atoms of carboxamide groups and singly-bound oxygen atoms, bound in ortho-position to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 235/60 . . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 235/62 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 235/64 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 235/66 . . with carbon atoms of carboxamide groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems and singly-bound oxygen atoms, bound to the same carbon skeleton
- C07C 235/68 . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom and to a carbon atom of a six-membered aromatic ring wherein at least one ortho-hydrogen atom has been replaced
- C07C 235/70 . having carbon atoms of carboxamide groups and doubly-bound oxygen atoms bound to the same carbon skeleton
- C07C 235/72 . . with the carbon atoms of the carboxamide groups bound to acyclic carbon atoms
- C07C 235/74 . . . of a saturated carbon skeleton
- C07C 235/76 . . . of an unsaturated carbon skeleton
- C07C 235/78 . . . . the carbon skeleton containing rings
- C07C 235/80 . . . having carbon atoms of carboxamide groups and keto groups bound to the same carbon atom, e.g. acetoacetamides
- C07C 235/82 . . with the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 235/84 . . with the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 235/86 . having the nitrogen atom of at least one of the carboxamide groups quaternised
- C07C 235/88 . having the nitrogen atom of at least one of the carboxamide groups further acylated
- C07C 237/00 Carboxylic acid amides, the carbon skeleton of the acid part being further substituted by amino groups**
- C07C 237/02 . having the carbon atoms of the carboxamide groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 237/04 . . the carbon skeleton being acyclic and saturated
- C07C 237/06 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 237/08 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 237/10 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups

- C07C 237/12 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups (peptides [C07K](#))
- C07C 237/14 . . the carbon skeleton being saturated and containing rings
- C07C 237/16 . . the carbon skeleton being acyclic and unsaturated
- C07C 237/18 . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 237/20 . . the carbon skeleton containing six-membered aromatic rings
- C07C 237/22 . . having nitrogen atoms of amino groups bound to the carbon skeleton of the acid part, further acylated (peptides [C07K](#))
- C07C 237/24 . having the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton
- C07C 237/26 . . of a ring being part of a condensed ring system formed by at least four rings, e.g. tetracycline
- C07C 237/28 . having the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a non-condensed six-membered aromatic ring of the carbon skeleton
- C07C 237/30 . . having the nitrogen atom of the carboxamide group bound to hydrogen atoms or to acyclic carbon atoms
- C07C 237/32 . . having the nitrogen atom of the carboxamide group bound to an acyclic carbon atom of a hydrocarbon radical substituted by oxygen atoms
- C07C 237/34 . . having the nitrogen atom of the carboxamide group bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 237/36 . . having the nitrogen atom of the carboxamide group bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups
- C07C 237/38 . . having the nitrogen atom of the carboxamide group bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 237/40 . . having the nitrogen atom of the carboxamide group bound to a carbon atom of a six-membered aromatic ring
- C07C 237/42 . . having nitrogen atoms of amino groups bound to the carbon skeleton of the acid part, further acylated
- C07C 237/44 . . having carbon atoms of carboxamide groups, amino groups and singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 237/46 . . having carbon atoms of carboxamide groups, amino groups and at least three atoms of bromine or iodine, bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 237/48 . having the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system of the same carbon skeleton
- C07C 237/50 . having the nitrogen atom of at least one of the carboxamide groups quaternised
- C07C 237/52 . having the nitrogen atom of at least one of the carboxamide groups further acylated

**C07C 239/00**      **Compounds containing nitrogen-to-halogen bonds; Hydroxylamino compounds or ethers or esters thereof** ([oximes C07C 251/00](#); [hydroxamic acids or derivatives thereof C07C 259/00](#))

- C07C 239/02      .    Compounds containing nitrogen-to-halogen bonds
- C07C 239/04      ..    N-halogenated amines
- C07C 239/06      ..    N-halogenated carboxamides
- C07C 239/08      .    Hydroxylamino compounds or their ethers or esters
- C07C 239/10      ..    having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of unsubstituted hydrocarbon radicals or of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups
- C07C 239/12      ..    having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms
- C07C 239/14      ..    having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by doubly-bound oxygen atoms
- C07C 239/16      ..    having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 239/18      ..    having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by carboxyl groups
- C07C 239/20      ..    having oxygen atoms of hydroxylamino groups etherified
- C07C 239/22      ..    having oxygen atoms of hydroxylamino groups esterified

**C07C 241/00**      **Preparation of compounds containing chains of nitrogen atoms singly-bound to each other, e.g. hydrazines, triazanes**

- C07C 241/02      .    Preparation of hydrazines
- C07C 241/04      .    Preparation of hydrazides

**C07C 243/00**      **Compounds containing chains of nitrogen atoms singly-bound to each other, e.g. hydrazines, triazanes**

- C07C 243/02      .    N-nitro compounds
- C07C 243/04      .    N-nitroso compounds
- C07C 243/06      ..    N-nitroso-amines
- C07C 243/08      ..    N-nitroso-carboxamides
- C07C 243/10      .    Hydrazines
- C07C 243/12      ..    having nitrogen atoms of hydrazine groups bound to acyclic carbon atoms
- C07C 243/14      ...    of a saturated carbon skeleton
- C07C 243/16      ...    of an unsaturated carbon skeleton

- C07C 243/18 . . . . containing rings
- C07C 243/20 . . having nitrogen atoms of hydrazine groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 243/22 . . having nitrogen atoms of hydrazine groups bound to carbon atoms of six-membered aromatic rings
- C07C 243/24 . Hydrazines having nitrogen atoms of hydrazine groups acylated by carboxylic acids
- C07C 243/26 . . with acylating carboxyl groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 243/28 . . . to hydrogen atoms or to carbon atoms of a saturated carbon skeleton
- C07C 243/30 . . . to carbon atoms of an unsaturated carbon skeleton
- C07C 243/32 . . . . the carbon skeleton containing rings
- C07C 243/34 . . . to carbon atoms of a carbon skeleton further substituted by nitrogen atoms
- C07C 243/36 . . with acylating carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 243/38 . . with acylating carboxyl groups bound to carbon atoms of six-membered aromatic rings
- C07C 243/40 . Hydrazines having nitrogen atoms of hydrazine groups being quaternised
- C07C 243/42 . Hydrazines having nitrogen atoms of hydrazine groups further singly-bound to hetero atoms
- C07C 245/00** **Compounds containing chains of at least two nitrogen atoms with at least one nitrogen-to-nitrogen multiple bond** ([azoxy compounds C07C 291/08](#))
- C07C 245/02 . Azo compounds, i.e. compounds having the free valencies of -N=N- groups attached to different atoms, e.g. diazohydroxides
- C07C 245/04 . . with nitrogen atoms of azo groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings
- C07C 245/06 . . with nitrogen atoms of azo groups bound to carbon atoms of six-membered aromatic rings
- C07C 245/08 . . . with the two nitrogen atoms of azo groups bound to carbon atoms of six-membered aromatic rings, e.g. azobenzene
- C07C 245/10 . . . with nitrogen atoms of azo groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems
- C07C 245/12 . Diazo compounds, i.e. compounds having the free valencies of =N<sub>2</sub> groups attached to the same carbon atom
- C07C 245/14 . . having diazo groups bound to acyclic carbon atoms of a carbon skeleton
- C07C 245/16 . . . Diazomethane
- C07C 245/18 . . . the carbon skeleton being further substituted by carboxyl groups
- C07C 245/20 . Diazonium compounds
- C07C 245/22 . containing chains of three or more nitrogen atoms with one or more nitrogen-to-nitrogen double bonds

C07C 245/24 . . Chains of only three nitrogen atoms, e.g. diazoamines

## **C07C 247/00 Compounds containing azido groups**

C07C 247/02 . with azido groups bound to acyclic carbon atoms of a carbon skeleton

C07C 247/04 . . being saturated

C07C 247/06 . . . and containing rings

C07C 247/08 . . being unsaturated

C07C 247/10 . . . and containing rings

C07C 247/12 . . being further substituted by carboxyl groups

C07C 247/14 . with azido groups bound to carbon atoms of rings other than six-membered aromatic rings

C07C 247/16 . with azido groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton

C07C 247/18 . . being further substituted by carboxyl groups

C07C 247/20 . with azido groups acylated by carboxylic acids

C07C 247/22 . . with the acylating carboxyl groups bound to hydrogen atoms, to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings

C07C 247/24 . . with at least one of the acylating carboxyl groups bound to a carbon atom of a six-membered aromatic ring

## **C07C 249/00 Preparation of compounds containing nitrogen atoms doubly-bound to a carbon skeleton (of diazo compounds [C07C 245/12](#))**

C07C 249/02 . of compounds containing imino groups

C07C 249/04 . of oximes

C07C 249/06 . . by nitrosation of hydrocarbons or substituted hydrocarbons

C07C 249/08 . . by reaction of hydroxylamines with carbonyl compounds

C07C 249/10 . . from nitro compounds or salts thereof

C07C 249/12 . . by reactions not involving the formation of oxyimino groups

C07C 249/14 . . Separation; Purification; Stabilisation; Use of additives

C07C 249/16 . of hydrazones

## **C07C 251/00 Compounds containing nitrogen atoms doubly-bound to a carbon skeleton (diazo compounds [C07C 245/12](#))**

C07C 251/02 . containing imino groups

C07C 251/04 . . having carbon atoms of imino groups bound to hydrogen atoms or to acyclic carbon atoms

C07C 251/06 . . . to carbon atoms of a saturated carbon skeleton

C07C 251/08	....	being acyclic
C07C 251/10	...	to carbon atoms of an unsaturated carbon skeleton
C07C 251/12	....	being acyclic
C07C 251/14	....	containing rings other than six-membered aromatic rings
C07C 251/16	....	containing six-membered aromatic rings
C07C 251/18	..	having carbon atoms of imino groups bound to carbon atoms of rings other than six-membered aromatic rings
C07C 251/20	..	having carbon atoms of imino groups being part of rings other than six-membered aromatic rings
C07C 251/22	...	Quinone imines
C07C 251/24	..	having carbon atoms of imino groups bound to carbon atoms of six-membered aromatic rings
C07C 251/26	..	having nitrogen atoms of imino groups further bound to halogen atoms
C07C 251/28	..	having nitrogen atoms of imino groups acylated
C07C 251/30	..	having nitrogen atoms of imino groups quaternised
C07C 251/32	.	Oximes
C07C 251/34	..	with oxygen atoms of oxyimino groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals
C07C 251/36	...	with the carbon atoms of the oxyimino groups bound to hydrogen atoms or to acyclic carbon atoms
C07C 251/38	....	to carbon atoms of a saturated carbon skeleton
C07C 251/40	....	to carbon atoms of an unsaturated carbon skeleton
C07C 251/42	...	with the carbon atom of at least one of the oxyimino groups bound to a carbon atom of a ring other than a six-membered aromatic ring
C07C 251/44	...	with the carbon atom of at least one of the oxyimino groups being part of a ring other than a six-membered aromatic ring
C07C 251/46	....	Quinone oximes
C07C 251/48	...	with the carbon atom of at least one of the oxyimino groups bound to a carbon atom of a six-membered aromatic ring
C07C 251/50	..	having oxygen atoms of oxyimino groups bound to carbon atoms of substituted hydrocarbon radicals
C07C 251/52	...	of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups
C07C 251/54	...	of hydrocarbon radicals substituted by singly-bound oxygen atoms
C07C 251/56	...	of hydrocarbon radicals substituted by doubly-bound oxygen atoms
C07C 251/58	...	of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups
C07C 251/60	...	of hydrocarbon radicals substituted by carboxyl groups
C07C 251/62	..	having oxygen atoms of oxyimino groups esterified
C07C 251/64	...	by carboxylic acids
C07C 251/66	....	with the esterifying carboxyl groups bound to hydrogen atoms, to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings

- C07C 251/68 . . . . with at least one of the esterifying carboxyl groups bound to a carbon atom of a six-membered aromatic ring
- C07C 251/70 . . Metal complexes of oximes
- C07C 251/72 . Hydrazones
- C07C 251/74 . . having doubly-bound carbon atoms of hydrazone groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 251/76 . . . to carbon atoms of a saturated carbon skeleton
- C07C 251/78 . . . to carbon atoms of an unsaturated carbon skeleton
- C07C 251/80 . . . . the carbon skeleton containing rings
- C07C 251/82 . . having doubly-bound carbon atoms of hydrazone groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 251/84 . . having doubly-bound carbon atoms of hydrazone groups being part of rings other than six-membered aromatic rings
- C07C 251/86 . . having doubly-bound carbon atoms of hydrazone groups bound to carbon atoms of six-membered aromatic rings
- C07C 251/88 . . having also the other nitrogen atom doubly-bound to a carbon atom, e.g. azines
- C07C 253/00 Preparation of carboxylic acid nitriles (of cyanogen or compounds thereof [C01C 3/00](#))**
- C07C 253/02 . by reaction of nitrogen oxide with organic compounds
- C07C 253/04 . by reaction of cyanogen halides, e.g. C1CN, with organic compounds
- C07C 253/06 . from N-formylated amino compounds
- C07C 253/08 . by addition of hydrogen cyanide or salts thereof to unsaturated compounds
- C07C 253/10 . . to compounds containing carbon-to-carbon double bonds
- C07C 253/12 . . to compounds containing carbon-to-carbon triple bonds
- C07C 253/14 . by reaction of cyanides with halogen-containing compounds with replacement of halogen atoms by cyano groups
- C07C 253/16 . by reaction of cyanides with lactones or compounds containing hydroxy groups or etherified or esterified hydroxy groups
- C07C 253/18 . by reaction of ammonia or amines with compounds containing carbon-to-carbon multiple bonds other than in six-membered aromatic rings
- C07C 253/20 . by dehydration of carboxylic acid amides
- C07C 253/22 . by reaction of ammonia with carboxylic acids with replacement of carboxyl groups by cyano groups
- C07C 253/24 . by ammoxidation of hydrocarbons or substituted hydrocarbons
- C07C 253/26 . . containing carbon-to-carbon multiple bonds, e.g. unsaturated aldehydes
- C07C 253/28 . . containing six-membered aromatic rings, e.g. styrene

- C07C 253/30 . by reactions not involving the formation of cyano groups
- C07C 253/32 . Separation; Purification; Stabilisation; Use of additives
- C07C 253/34 . . Separation; Purification
- C07C 255/00** **Carboxylic acid nitriles** (cyanogen or compounds thereof [C01C 3/00](#))
  - C07C 255/01 . having cyano groups bound to acyclic carbon atoms
  - C07C 255/02 . . of an acyclic and saturated carbon skeleton
    - C07C 255/03 . . . Mononitriles
    - C07C 255/04 . . . containing two cyano groups bound to the carbon skeleton
    - C07C 255/05 . . . containing at least three cyano groups bound to the carbon skeleton
  - C07C 255/06 . . of an acyclic and unsaturated carbon skeleton
    - C07C 255/07 . . . Mononitriles
    - C07C 255/08 . . . . Acrylonitrile; Methacrylonitrile
    - C07C 255/09 . . . containing at least two cyano groups bound to the carbon skeleton
  - C07C 255/10 . . containing cyano groups and halogen atoms, or nitro or nitroso groups, bound to the same acyclic carbon skeleton
  - C07C 255/11 . . containing cyano groups and singly-bound oxygen atoms bound to the same saturated acyclic carbon skeleton
    - C07C 255/12 . . . containing cyano groups and hydroxy groups bound to the carbon skeleton
    - C07C 255/13 . . . containing cyano groups and etherified hydroxy groups bound to the carbon skeleton
    - C07C 255/14 . . . containing cyano groups and esterified hydroxy groups bound to the carbon skeleton
  - C07C 255/15 . . containing cyano groups and singly-bound oxygen atoms bound to the same unsaturated acyclic carbon skeleton
  - C07C 255/16 . . containing cyano groups and singly-bound oxygen atoms bound to the same carbon atom of an acyclic carbon skeleton
  - C07C 255/17 . . containing cyano groups and doubly-bound oxygen atoms bound to the same acyclic carbon skeleton
  - C07C 255/18 . . containing cyano groups bound to carbon atoms of carboxyl groups
  - C07C 255/19 . . containing cyano groups and carboxyl groups, other than cyano groups, bound to the same saturated acyclic carbon skeleton
    - C07C 255/20 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms
    - C07C 255/21 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms
  - C07C 255/22 . . . containing cyano groups and at least two carboxyl groups bound to the carbon skeleton
  - C07C 255/23 . . containing cyano groups and carboxyl groups, other than cyano groups, bound to the same unsaturated acyclic carbon skeleton
  - C07C 255/24 . . containing cyano groups and singly-bound nitrogen atoms, not being further bound to other hetero atoms, bound to the same saturated acyclic carbon skeleton
  - C07C 255/25 . . . Aminoacetoneitriles

- C07C 255/26 . . . containing cyano groups, amino groups and singly-bound oxygen atoms bound to the carbon skeleton
- C07C 255/27 . . . containing cyano groups, amino groups and doubly-bound oxygen atoms bound to the carbon skeleton
- C07C 255/28 . . . containing cyano groups, amino groups and carboxyl groups, other than cyano groups, bound to the carbon skeleton
- C07C 255/29 . . . containing cyano groups and acylated amino groups bound to the carbon skeleton
- C07C 255/30 . . containing cyano groups and singly-bound nitrogen atoms, not being further bound to other hetero atoms, bound to the same unsaturated acyclic carbon skeleton
- C07C 255/31 . . having cyano groups bound to acyclic carbon atoms of a carbon skeleton containing rings other than six-membered aromatic rings
- C07C 255/32 . . having cyano groups bound to acyclic carbon atoms of a carbon skeleton containing at least one six-membered aromatic ring
- C07C 255/33 . . . with cyano groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by saturated carbon chains
- C07C 255/34 . . . with cyano groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by unsaturated carbon chains
- C07C 255/35 . . . the carbon skeleton being further substituted by halogen atoms, or by nitro or nitroso groups
- C07C 255/36 . . . the carbon skeleton being further substituted by hydroxy groups
- C07C 255/37 . . . the carbon skeleton being further substituted by etherified hydroxy groups
- C07C 255/38 . . . the carbon skeleton being further substituted by esterified hydroxy groups
- C07C 255/39 . . . . with hydroxy groups esterified by derivatives of 2,2-dimethylcyclopropane carboxylic acids, e.g. of chrysanthemumic acids
- C07C 255/40 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms
- C07C 255/41 . . . the carbon skeleton being further substituted by carboxyl groups, other than cyano groups
- C07C 255/42 . . . the carbon skeleton being further substituted by singly-bound nitrogen atoms, not being further bound to other hetero atoms
- C07C 255/43 . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 255/44 . . . . at least one of the singly-bound nitrogen atoms being acylated
- C07C 255/45 . having cyano groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 255/46 . . to carbon atoms of non-condensed rings
- C07C 255/47 . . to carbon atoms of rings being part of condensed ring systems
- C07C 255/48 . . to carbon atoms of 2,2-dimethylcyclopropane rings, e.g. nitrile of chrysanthemumic acids
- C07C 255/49 . having cyano groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton
- C07C 255/50 . . to carbon atoms of non-condensed six-membered aromatic rings
- C07C 255/51 . . . containing at least two cyano groups bound to the carbon skeleton
- C07C 255/52 . . to carbon atoms of six-membered aromatic rings being part of condensed ring systems

- C07C 255/53 . . containing cyano groups and hydroxy groups bound to the carbon skeleton
- C07C 255/54 . . containing cyano groups and etherified hydroxy groups bound to the carbon skeleton
- C07C 255/55 . . containing cyano groups and esterified hydroxy groups bound to the carbon skeleton
- C07C 255/56 . . containing cyano groups and doubly-bound oxygen atoms bound to the carbon skeleton
- C07C 255/57 . . containing cyano groups and carboxyl groups, other than cyano groups, bound to the carbon skeleton
- C07C 255/58 . . containing cyano groups and singly-bound nitrogen atoms, not being further bound to other hetero atoms, bound to the carbon skeleton
- C07C 255/59 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 255/60 . . . at least one of the singly-bound nitrogen atoms being acylated
- C07C 255/61 . containing cyano groups and nitrogen atoms being part of imino group bound to the same carbon skeleton
- C07C 255/62 . containing cyano groups and oxygen atoms being part of oximino groups bound to the same carbon skeleton
- C07C 255/63 . containing cyano groups and nitrogen atoms further bound to other hetero atoms, other than oxygen atoms of nitro or nitroso groups, bound to the same carbon skeleton
- C07C 255/64 . . with the nitrogen atoms further bound to oxygen atoms
- C07C 255/65 . . with the nitrogen atoms further bound to nitrogen atoms
- C07C 255/66 . . . having cyano groups and nitrogen atoms being part of hydrazine or hydrazone groups bound to the same carbon skeleton
- C07C 255/67 . . . having cyano groups and azido groups bound to the same carbon skeleton
- C07C 257/00** **Compounds containing carboxyl groups, the doubly-bound oxygen atom of a carboxyl group being replaced by a doubly-bound nitrogen atom, this nitrogen atom not being further bound to an oxygen atom, e.g. imino-ethers, amidines**
- C07C 257/02 . with replacement of the other oxygen atom of the carboxyl group by halogen atoms, e.g. imino-halides
- C07C 257/04 . without replacement of the other oxygen atom of the carboxyl group, e.g. imino-ethers
- C07C 257/06 . . having carbon atoms of imino-carboxyl groups bound to hydrogen atoms, to acyclic carbon atoms, or to carbon atoms of rings other than six-membered aromatic rings
- C07C 257/08 . . having carbon atoms of imino-carboxyl groups bound to carbon atoms of six-membered aromatic rings
- C07C 257/10 . with replacement of the other oxygen atom of the carboxyl group by nitrogen atoms, e.g. amidines
- C07C 257/12 . . having carbon atoms of amidino groups bound to hydrogen atoms
- C07C 257/14 . . having carbon atoms of amidino groups bound to acyclic carbon atoms

- C07C 257/16 . . having carbon atoms of amidino groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 257/18 . . having carbon atoms of amidino groups bound to carbon atoms of six-membered aromatic rings
- C07C 257/20 . . having nitrogen atoms of amidino groups acylated
- C07C 257/22 . . having nitrogen atoms of amidino groups further bound to nitrogen atoms, e.g. hydrazidines

**C07C 259/00** **Compounds containing carboxyl groups, an oxygen atom of a carboxyl group being replaced by a nitrogen atom, this nitrogen atom being further bound to an oxygen atom and not being part of nitro or nitroso groups**

- C07C 259/02 . with replacement of the other oxygen atom of the carboxyl group by halogen atoms
- C07C 259/04 . without replacement of the other oxygen atom of the carboxyl group, e.g. hydroxamic acids
- C07C 259/06 . . having carbon atoms of hydroxamic groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 259/08 . . having carbon atoms of hydroxamic groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 259/10 . . having carbon atoms of hydroxamic groups bound to carbon atoms of six-membered aromatic rings
- C07C 259/12 . with replacement of the other oxygen atom of the carboxyl group by nitrogen atoms, e.g. N-hydroxyamidines
- C07C 259/14 . . having carbon atoms of hydroxamidine groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 259/16 . . having carbon atoms of hydroxamidine groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 259/18 . . having carbon atoms of hydroxamidine groups bound to carbon atoms of six-membered aromatic rings
- C07C 259/20 . . with at least one nitrogen atom of hydroxamidine groups bound to another nitrogen atom

**C07C 261/00** **Derivatives of cyanic acid**

- C07C 261/02 . Cyanates
- C07C 261/04 . Cyanamides ([unsubstituted cyanamide C01C 3/16](#))

**C07C 263/00** **Preparation of derivatives of isocyanic acid**

- C07C 263/02 . by reaction of halides with isocyanic acid or its derivatives
- C07C 263/04 . from or via carbamates or carbamoyl halides
- C07C 263/06 . from or via ureas

- C07C 263/08 . from or via heterocyclic compounds, e.g. pyrolysis of furoxans
- C07C 263/10 . by reaction of amines with carbonyl halides, e.g. with phosgene
- C07C 263/12 . from or via nitrogen analogues of carboxylic acids, e.g. from hydroxamic acids, involving a Hofmann, Curtius or Lossen-type rearrangement ([C07C 209/56 takes precedence](#))
- C07C 263/14 . by catalytic reaction of nitro compounds with carbon monoxide
- C07C 263/16 . by reactions not involving the formation of isocyanate groups
- C07C 263/18 . Separation; Purification; Stabilisation; Use of additives
- C07C 263/20 . . Separation; Purification

### **C07C 265/00 Derivatives of isocyanic acid**

- C07C 265/02 . having isocyanate groups bound to acyclic carbon atoms
- C07C 265/04 . . of a saturated carbon skeleton
- C07C 265/06 . . of an unsaturated carbon skeleton
- C07C 265/08 . . . the carbon skeleton containing rings
- C07C 265/10 . having isocyanate groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 265/12 . having isocyanate groups bound to carbon atoms of six-membered aromatic rings
- C07C 265/14 . containing at least two isocyanate groups bound to the same carbon skeleton
- C07C 265/16 . having isocyanate groups acylated

### **C07C 267/00 Carbodiimides**

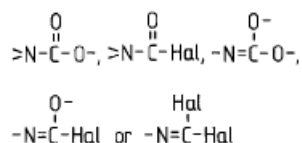
**C07C 269/00 Preparation of derivatives of carbamic acid, i.e. compounds containing any of the groups**  $\begin{array}{c} \text{O} \\ \parallel \\ >\text{N}-\text{C}-\text{O}- \end{array}$ ,  $\begin{array}{c} \text{O} \\ \parallel \\ >\text{N}-\text{C}-\text{Hal} \end{array}$ ,  $\begin{array}{c} \text{O}- \\ \parallel \\ -\text{N}=\text{C}-\text{O}- \end{array}$ ,  $\begin{array}{c} \text{O}- \\ \parallel \\ -\text{N}=\text{C}-\text{Hal} \end{array}$  or  $\begin{array}{c} \text{Hal} \\ \parallel \\ -\text{N}=\text{C}-\text{Hal} \end{array}$ , the nitrogen atom not being part of nitro or

**nitroso groups**

- C07C 269/02 . from isocyanates with formation of carbamate groups
- C07C 269/04 . from amines with formation of carbamate groups
- C07C 269/06 . by reactions not involving the formation of carbamate groups

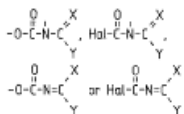
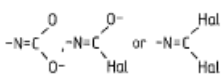
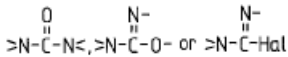
C07C 269/08 . Separation; Purification; Stabilisation; Use of additives

**C07C 271/00** **Derivatives of carbamic acids, i.e. compounds containing any of the groups**  
**, the nitrogen atom not being part of nitro or nitroso**



**groups**

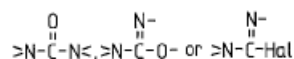
- C07C 271/02 . Carbamic acids; Salts of carbamic acids ([unsubstituted carbamic acid or salts thereof C01B 21/12](#))
- C07C 271/04 . Carbamic acid halides
- C07C 271/06 . Esters of carbamic acids
- C07C 271/08 . . having oxygen atoms of carbamate groups bound to acyclic carbon atoms
- C07C 271/10 . . . with the nitrogen atoms of the carbamate groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 271/12 . . . . to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals
- C07C 271/14 . . . . to carbon atoms of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups
- C07C 271/16 . . . . to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms
- C07C 271/18 . . . . to carbon atoms of hydrocarbon radicals substituted by doubly-bound oxygen atoms
- C07C 271/20 . . . . to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 271/22 . . . . to carbon atoms of hydrocarbon radicals substituted by carboxyl groups
- C07C 271/24 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 271/26 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a six-membered aromatic ring
- C07C 271/28 . . . . to a carbon atom of a non-condensed six-membered aromatic ring
- C07C 271/30 . . . . to a carbon atom of a six-membered aromatic ring being part of a condensed ring system
- C07C 271/32 . . having oxygen atoms of carbamate groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 271/34 . . . with the nitrogen atoms of the carbamate groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 271/36 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 271/38 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a six-membered aromatic ring
- C07C 271/40 . . having oxygen atoms of carbamate groups bound to carbon atoms of six-membered aromatic rings

- C07C 271/42 . . . with the nitrogen atoms of the carbamate groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 271/44 . . . . to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals
- C07C 271/46 . . . . to carbon atoms of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups
- C07C 271/48 . . . . to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms
- C07C 271/50 . . . . to carbon atoms of hydrocarbon radicals substituted by doubly-bound oxygen atoms
- C07C 271/52 . . . . to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 271/54 . . . . to carbon atoms of hydrocarbon radicals substituted by carboxyl groups
- C07C 271/56 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 271/58 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a six-membered aromatic ring
- C07C 271/60 . having oxygen atoms of carbamate groups bound to nitrogen atoms
- C07C 271/62 . Compounds containing any of the groups , X being a hetero atom, Y being any atom, e.g. N-acylcarbamates
- C07C 271/64 . . Y being a hydrogen or a carbon atom, e.g. benzoylcarbamates
- C07C 271/66 . . Y being a hetero atom
- C07C 271/68 . Compounds containing any of the groups 
- C07C 273/00 Preparation of urea or its derivatives, i.e. compounds containing any of the groups , the nitrogen atoms not being part of nitro or nitroso groups**
- C07C 273/02 . of urea, its salts, complexes or addition compounds
- C07C 273/025 . . {of solutions of urea and formaldehyde}
- C07C 273/04 . . from carbon dioxide and ammonia
- C07C 273/06 . . from cyanamide or calcium cyanamide
- C07C 273/08 . . from ammoniacal liquor
- C07C 273/10 . . combined with the synthesis of ammonia
- C07C 273/12 . . combined with the synthesis of melamine
- C07C 273/14 . . Separation; Purification; Stabilisation; Use of additives
- C07C 273/16 . . . Separation; Purification

- C07C 273/18 . of substituted ureas
- C07C 273/1809 .. {with formation of the N-C(O)-N moiety}
- C07C 273/1818 ... {from -N=C=O and XNR`R"}
- C07C 273/1827 .... {X being H}
- C07C 273/1836 ... {from derivatives of carbamic acid}
- C07C 273/1845 .... {comprising the -N-C(O)-Hal moiety}
- C07C 273/1854 .. {by reactions not involving the formation of the N-C(O)-N- moiety}
- C07C 273/1863 ... {from urea}
- C07C 273/1872 .. {Preparation of compounds comprising a -N-C(O)-N-C(O)-N- moiety}
- C07C 273/1881 ... {from urea}
- C07C 273/189 .. {Purification, separation, stabilisation, use of additives}

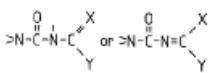
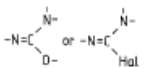
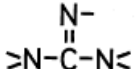
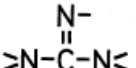
**C07C 275/00**

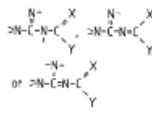
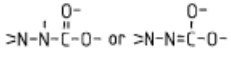
**Derivatives of urea, i.e. compounds containing any of the groups**  
**, the nitrogen atoms not being part of nitro or nitroso**



**groups**

- C07C 275/02 . Salts; Complexes; Addition compounds
- C07C 275/04 . having nitrogen atoms of urea groups bound to acyclic carbon atoms
- C07C 275/06 .. of an acyclic and saturated carbon skeleton
- C07C 275/08 ... being further substituted by halogen atoms, or by nitro or nitroso groups
- C07C 275/10 ... being further substituted by singly-bound oxygen atoms
- C07C 275/12 ... being further substituted by doubly-bound oxygen atoms
- C07C 275/14 ... being further substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 275/16 ... being further substituted by carboxyl groups
- C07C 275/18 .. of a saturated carbon skeleton containing rings
- C07C 275/20 .. of an unsaturated carbon skeleton
- C07C 275/22 ... containing rings other than six-membered aromatic rings
- C07C 275/24 ... containing six-membered aromatic rings
- C07C 275/26 . having nitrogen atoms of urea groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 275/28 . having nitrogen atoms of urea groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton
- C07C 275/30 .. being further substituted by halogen atoms, or by nitro or nitroso groups
- C07C 275/32 .. being further substituted by singly-bound oxygen atoms
- C07C 275/34 ... having nitrogen atoms of urea groups and singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 275/36 .... with at least one of the oxygen atoms further bound to a carbon atom of a six-membered aromatic ring, e.g. N-aryloxyphenylureas

- C07C 275/38 . . . being further substituted by doubly-bound oxygen atoms
- C07C 275/40 . . . being further substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 275/42 . . . being further substituted by carboxyl groups
- C07C 275/44 . . . having nitrogen atoms of urea groups doubly-bound to carbon atoms
- C07C 275/46 . . . containing any of the groups , X being a hetero atom, Y being any atom, e.g. acylureas
- C07C 275/48 . . . Y being a hydrogen or a carbon atom
- C07C 275/50 . . . Y being a hydrogen or an acyclic carbon atom
- C07C 275/52 . . . Y being a carbon atom of a ring other than a six-membered aromatic ring
- C07C 275/54 . . . Y being a carbon atom of a six-membered aromatic ring, e.g. benzoylureas
- C07C 275/56 . . . X being a nitrogen atom
- C07C 275/58 . . . Y being a hetero atom
- C07C 275/60 . . . Y being an oxygen atom, e.g. allophanic acids
- C07C 275/62 . . . Y being a nitrogen atom, e.g. biuret
- C07C 275/64 . . . having nitrogen atoms of urea groups singly-bound to oxygen atoms
- C07C 275/66 . . . having nitrogen atoms of urea groups bound to halogen atoms or to nitro or nitroso groups
- C07C 275/68 . . . N-nitroso ureas
- C07C 275/70 . . . Compounds containing any of the groups , e.g. isoureas
- C07C 277/00 Preparation of guanidine or its derivatives, i.e. compounds containing the group , the singly-bound nitrogen atoms not being part of nitro or nitroso groups**
- C07C 277/02 . . . of guanidine from cyanamide, calcium cyanamide or dicyandiamides
- C07C 277/04 . . . of guanidine from ammonium thiocyanate
- C07C 277/06 . . . Purification or separation of guanidine
- C07C 277/08 . . . of substituted guanidines
- C07C 279/00 Derivatives of guanidine, i.e. compounds containing the group , the singly-bound nitrogen atoms not being part of nitro or nitroso groups**

- C07C 279/02** . Guanidine; Salts, complexes or addition compounds thereof
- C07C 279/04** . having nitrogen atoms of guanidine groups bound to acyclic carbon atoms of a carbon skeleton
- C07C 279/06** . . being further substituted by halogen atoms, or by nitro or nitroso groups
- C07C 279/08** . . being further substituted by singly-bound oxygen atoms
- C07C 279/10** . . being further substituted by doubly-bound oxygen atoms
- C07C 279/12** . . being further substituted by nitrogen atoms not being part of nitro or nitroso groups
- C07C 279/14** . . being further substituted by carboxyl groups
- C07C 279/16** . having nitrogen atoms of guanidine groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 279/18** . having nitrogen atoms of guanidine groups bound to carbon atoms of six-membered aromatic rings
- C07C 279/20** . containing any of the groups , X being a hetero atom, Y being any atom, e.g. acylguanidines
- C07C 279/22** . . Y being a hydrogen or a carbon atom, e.g. benzoylguanidines
- C07C 279/24** . . Y being a hetero atom
- C07C 279/26** . . . X and Y being nitrogen atoms, i.e. biguanides
- C07C 279/265** . . . {containing two or more biguanide groups}
- C07C 279/28** . having nitrogen atoms of guanidine groups bound to cyano groups, e.g. cyanoguanidines, dicyandiamides
- C07C 279/30** . having nitrogen atoms of guanidine groups bound to nitro or nitroso groups
- C07C 279/32** . . N-nitroguanidines
- C07C 279/34** . . . N-nitroguanidine
- C07C 279/36** . . . Substituted N-nitroguanidines
- C07C 281/00** **Derivatives of carbonic acid containing functional groups covered by groups [C07C 269/00](#) to [C07C 279/00](#) in which at least one nitrogen atom of these functional groups is further bound to another nitrogen atom not being part of a nitro or nitroso group**
- C07C 281/02** . Compounds containing any of the groups , e.g. carbazates
- C07C 281/04** . . the other nitrogen atom being further doubly-bound to a carbon atom

- C07C 281/06 . Compounds containing any of the groups  $\begin{array}{c} \text{O} \\ \parallel \\ >\text{N}-\text{N}-\text{C}-\text{N}< \\ | \\ \text{O}^- \end{array}$  or  $\begin{array}{c} \text{O}^- \\ | \\ >\text{N}-\text{N}=\text{C}-\text{N}< \end{array}$ , e.g. semicarbazides
- C07C 281/08 . . the other nitrogen atom being further doubly-bound to a carbon atom, e.g. semicarbazones
- C07C 281/10 . . . the carbon atom being further bound to an acyclic carbon atom or to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 281/12 . . . the carbon atom being part of a ring other than a six-membered aromatic ring
- C07C 281/14 . . . the carbon atom being further bound to a carbon atom of a six-membered aromatic ring
- C07C 281/16 . Compounds containing any of the groups  $\begin{array}{c} \text{N}- \\ \parallel \\ >\text{N}-\text{N}-\text{C}-\text{N}< \end{array}$  or  $\begin{array}{c} -\text{N}- \\ | \\ >\text{N}-\text{N}=\text{C}-\text{N}< \end{array}$ , e.g. aminoguanidine
- C07C 281/18 . . the other nitrogen atom being further doubly-bound to a carbon atom, e.g. guanylhydrazones
- C07C 281/20 . the two nitrogen atoms of the functional groups being doubly-bound to each other, e.g. azoformamide
- C07C 291/00** **Compounds containing carbon and nitrogen and having functional groups not covered by groups [C07C 201/00](#) to [C07C 281/00](#)**
- C07C 291/02 . containing nitrogen-oxide bonds
- C07C 291/04 . . containing amino-oxide bonds
- C07C 291/06 . . Nitrile oxides
- C07C 291/08 . . Azoxy compounds
- C07C 291/10 . Isocyanides
- C07C 291/12 . Fulminates
- C07C 291/14 . containing at least one carbon atom bound to a nitro or nitroso group and doubly-bound to a hetero atom

**Guidance heading:** **Compounds containing carbon together with sulfur, selenium, or tellurium, with or without hydrogen, halogens, oxygen, or nitrogen** (irradiation products of cholesterol or its derivatives [C07C 401/00](#); vitamin D derivatives, 9-10-seco cyclopenta[a]phenanthrene or analogues obtained by chemical preparation without irradiation [C07C 401/00](#); derivatives of cyclohexane or of a cyclohexene { or of cyclohexadiene}, having a side-chain containing an acyclic unsaturated part of at least four carbon atoms, this part being directly attached to the cyclohexane or cyclohexene { or cyclohexadiene} rings [C07C 403/00](#); prostaglandins or derivatives thereof [C07C 405/00](#); peroxy compounds [C07C 407/00](#), [C07C 409/00](#))

**C07C 301/00** **Esters of sulfurous acid** (cyclic esters [C07D](#))

- C07C 301/02 . having sulfite groups bound to carbon atoms of six-membered aromatic rings
- C07C 303/00 Preparation of esters or amides of sulfuric acids; Preparation of sulfonic acids or of their esters, halides, anhydrides or amides**
  - C07C 303/02 . of sulfonic acids or halides thereof
  - C07C 303/04 . . by substitution of hydrogen atoms by sulfo or halosulfonyl groups
  - C07C 303/06 . . . by reaction with sulfuric acid or sulfur trioxide
  - C07C 303/08 . . . by reaction with halogenosulfonic acids
  - C07C 303/10 . . . by reaction with sulfur dioxide and halogen or by reaction with sulfonyl halides
  - C07C 303/12 . . . by reaction with thionylhalides
  - C07C 303/14 . . by sulfoxidation, i.e. by reaction with sulfur dioxide and oxygen with formation of sulfo or halosulfonyl groups
  - C07C 303/16 . . by oxidation of thiols, sulfides, hydropolysulfides, or polysulfides with formation of sulfo or halosulfonyl groups
  - C07C 303/18 . . by reaction of sulfides with compounds having functional groups with formation of sulfo or halosulfonyl groups
  - C07C 303/20 . . by addition of sulfurous acid or salts thereof to compounds having carbon-to-carbon multiple bonds
  - C07C 303/22 . . from sulfonic acids, by reactions not involving the formation of sulfo or halosulfonyl groups; {from sulfonic halides by reactions not involving the formation of halosulfonyl groups}
  - C07C 303/24 . of esters of sulfuric acids
  - C07C 303/26 . of esters of sulfonic acids
  - C07C 303/28 . . by reaction of hydroxy compounds with sulfonic acids or derivatives thereof
  - C07C 303/30 . . by reactions not involving the formation of esterified sulfo groups
  - C07C 303/32 . of salts of sulfonic acids
  - C07C 303/34 . of amides of sulfuric acids
  - C07C 303/36 . of amides of sulfonic acids
  - C07C 303/38 . . by reaction of ammonia or amines with sulfonic acids, or with esters, anhydrides, or halides thereof
  - C07C 303/40 . . by reactions not involving the formation of sulfonamide groups
  - C07C 303/42 . Separation; Purification; Stabilisation; Use of additives
  - C07C 303/44 . . Separation; Purification
  - C07C 303/46 . . . from by-products of refining mineral oils with sulfuric acid
- C07C 305/00 Esters of sulfuric acids (cyclic esters [C07D](#))**

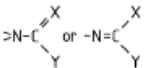
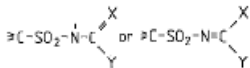
- C07C 305/02 . having oxygen atoms of sulfate groups bound to acyclic carbon atoms of a carbon skeleton
- C07C 305/04 .. being acyclic and saturated
- C07C 305/06 ... Hydrogenosulfates
- C07C 305/08 ... Dialkylsulfates; Substituted dialkylsulfates
- C07C 305/10 ... being further substituted by singly-bound oxygen atoms
- C07C 305/12 .. being saturated and containing rings
- C07C 305/14 .. being acyclic and unsaturated
- C07C 305/16 .. being unsaturated and containing rings
- C07C 305/18 ... containing six-membered aromatic rings
  
- C07C 305/20 . having oxygen atoms of sulfate groups bound to carbon atoms of rings other than six-membered aromatic rings
  
- C07C 305/22 . having oxygen atoms of sulfate groups bound to carbon atoms of six-membered aromatic rings
- C07C 305/24 .. of non-condensed six-membered aromatic rings
  
- C07C 305/26 . Halogenosulfates, i.e. monoesters of halogenosulfuric acids
  
- C07C 307/00 Amides of sulfuric acids, i.e. compounds having singly-bound oxygen atoms of sulfate groups replaced by nitrogen atoms, not being part of nitro or nitroso groups**
  
- C07C 307/02 . Monoamides of sulfuric acids or esters thereof, e.g. sulfamic acids
  
- C07C 307/04 . Diamides of sulfuric acids
- C07C 307/06 .. having nitrogen atoms of the sulfamide groups bound to acyclic carbon atoms
- C07C 307/08 .. having nitrogen atoms of the sulfamide groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 307/10 .. having nitrogen atoms of the sulfamide groups bound to carbon atoms of six-membered aromatic rings
  
- C07C 309/00 Sulfonic acids; Halides, esters, or anhydrides thereof**
  
- C07C 309/01 . Sulfonic acids
- C07C 309/02 .. having sulfo groups bound to acyclic carbon atoms
- C07C 309/03 ... of an acyclic saturated carbon skeleton
- C07C 309/04 .... containing only one sulfo group
- C07C 309/05 .... containing at least two sulfo groups bound to the carbon skeleton
- C07C 309/06 .... containing halogen atoms, or nitro or nitroso groups bound to the carbon skeleton
- C07C 309/07 .... containing oxygen atoms bound to the carbon skeleton
- C07C 309/08 ..... containing hydroxy groups bound to the carbon skeleton

C07C 309/09	.....	containing etherified hydroxy groups bound to the carbon skeleton
C07C 309/10	.....	with the oxygen atom of at least one of the etherified hydroxy groups further bound to an acyclic carbon atom
C07C 309/11	.....	with the oxygen atom of at least one of the etherified hydroxy groups further bound to a carbon atom of a six-membered aromatic ring
C07C 309/12	.....	containing esterified hydroxy groups bound to the carbon skeleton
C07C 309/13	....	containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton
C07C 309/14	.....	containing amino groups bound to the carbon skeleton
C07C 309/15	.....	the nitrogen atom of at least one of the amino groups being part of any of the groups $\text{>N}-\overset{\text{X}}{\underset{\text{H}}{\text{C}}}-\text{Y}$ or $-\text{N}=\overset{\text{X}}{\underset{\text{Y}}{\text{C}}}$ , X being a hetero atom, Y being any atom
C07C 309/16	.....	containing doubly-bound nitrogen atoms bound to the carbon skeleton
C07C 309/17	....	containing carboxyl groups bound to the carbon skeleton
C07C 309/18	.....	containing amino groups bound to the same carbon skeleton
C07C 309/19	...	of a saturated carbon skeleton containing rings
C07C 309/20	...	of an acyclic unsaturated carbon skeleton
C07C 309/21	....	containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton
C07C 309/22	....	containing carboxyl groups bound to the carbon skeleton
C07C 309/23	...	of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings
C07C 309/24	...	of a carbon skeleton containing six-membered aromatic rings
C07C 309/25	..	having sulfo groups bound to carbon atoms of rings other than six-membered aromatic rings of a carbon skeleton
C07C 309/26	...	containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton
C07C 309/27	...	containing carboxyl groups bound to the carbon skeleton
C07C 309/28	..	having sulfo groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton
C07C 309/29	...	of non-condensed six-membered aromatic rings
C07C 309/30	....	of six-membered aromatic rings substituted by alkyl groups
C07C 309/31	.....	by alkyl groups containing at least three carbon atoms
C07C 309/32	....	containing at least two non-condensed six-membered aromatic rings in the carbon skeleton
C07C 309/33	...	of six-membered aromatic rings being part of condensed ring systems
C07C 309/34	....	formed by two rings
C07C 309/35	.....	Naphthalene sulfonic acids
C07C 309/36	.....	substituted by alkyl groups
C07C 309/37	.....	by alkyl groups containing at least three carbon atoms
C07C 309/38	....	formed by at least three rings
C07C 309/39	...	containing halogen atoms bound to the carbon skeleton

C07C 309/40	...	containing nitro or nitroso groups bound to the carbon skeleton
C07C 309/41	...	containing singly-bound oxygen atoms bound to the carbon skeleton
C07C 309/42	....	having the sulfo groups bound to carbon atoms of non-condensed six-membered aromatic rings
C07C 309/43	....	having at least one of the sulfo groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system
C07C 309/44	...	containing doubly-bound oxygen atoms bound to the carbon skeleton
C07C 309/45	...	containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton
C07C 309/46	....	having the sulfo groups bound to carbon atoms of non-condensed six-membered aromatic rings
C07C 309/47	....	having at least one of the sulfo groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system
C07C 309/48	....	the carbon skeleton being further substituted by halogen atoms
C07C 309/49	....	the carbon skeleton being further substituted by singly-bound oxygen atoms
C07C 309/50	.....	having at least one of the sulfo groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system
C07C 309/51	....	at least one of the nitrogen atoms being part of any of the groups $\begin{array}{c} \text{X} \\ \diagup \\ \text{>N-C} \\ \diagdown \\ \text{Y} \end{array} \text{ or } \begin{array}{c} \text{X} \\ \diagup \\ \text{-N=C} \\ \diagdown \\ \text{Y} \end{array}, \text{ X being a hetero atom, Y being any atom}$
C07C 309/52	....	the carbon skeleton being further substituted by doubly-bound oxygen atoms
C07C 309/53	.....	the carbon skeleton containing carbon atoms of quinone rings
C07C 309/54	.....	at least one of the nitrogen atoms being part of any of the groups $\begin{array}{c} \text{X} \\ \diagup \\ \text{>N-C} \\ \diagdown \\ \text{Y} \end{array} \text{ or } \begin{array}{c} \text{X} \\ \diagup \\ \text{-N=C} \\ \diagdown \\ \text{Y} \end{array}, \text{ X being a hetero atom, Y being any atom}$
C07C 309/55	.....	Y being a hydrogen or a carbon atom
C07C 309/56	.....	Y being a hetero atom
C07C 309/57	...	containing carboxyl groups bound to the carbon skeleton
C07C 309/58	....	Carboxylic acid groups or esters thereof
C07C 309/59	....	Nitrogen analogues of carboxyl groups
C07C 309/60	....	the carbon skeleton being further substituted by singly-bound oxygen atoms
C07C 309/61	....	the carbon skeleton being further substituted by nitrogen atoms, not being part of nitro or nitroso groups
C07C 309/62	..	Sulfonated fats, oils or waxes of undetermined constitution ( <a href="#">chemical modification of petroleum waxes C10G 73/38</a> ){ <a href="#">Bituminosulfonic acid C07G 9/00</a> }
C07C 309/63	.	Esters of sulfonic acids
C07C 309/64	..	having sulfur atoms of esterified sulfo groups bound to acyclic carbon atoms
C07C 309/65	...	of a saturated carbon skeleton
C07C 309/66	....	Methanesulfonates
C07C 309/67	...	of an unsaturated carbon skeleton
C07C 309/68	...	of a carbon skeleton substituted by singly-bound oxygen atoms

- C07C 309/69 . . . of a carbon skeleton substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 309/70 . . . of a carbon skeleton substituted by carboxyl groups
- C07C 309/71 . . having sulfur atoms of esterified sulfo groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 309/72 . . having sulfur atoms of esterified sulfo groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton
- C07C 309/73 . . . to carbon atoms of non-condensed six-membered aromatic rings
- C07C 309/74 . . . to carbon atoms of six-membered aromatic rings being part of condensed ring systems
- C07C 309/75 . . . containing singly-bound oxygen atoms bound to the carbon skeleton
- C07C 309/76 . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton
- C07C 309/77 . . . containing carboxyl groups bound to the carbon skeleton
  
- C07C 309/78 . Halides of sulfonic acids
- C07C 309/79 . . having halosulfonyl groups bound to acyclic carbon atoms
- C07C 309/80 . . . of a saturated carbon skeleton
- C07C 309/81 . . . of an unsaturated carbon skeleton
- C07C 309/82 . . . of a carbon skeleton substituted by singly-bound oxygen atoms
- C07C 309/83 . . . of a carbon skeleton substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 309/84 . . . of a carbon skeleton substituted by carboxyl groups
- C07C 309/85 . . having halosulfonyl groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 309/86 . . having halosulfonyl groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton
- C07C 309/87 . . . containing singly-bound oxygen atoms bound to the carbon skeleton
- C07C 309/88 . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton
- C07C 309/89 . . . containing carboxyl groups bound to the carbon skeleton
  
- C07C 311/00 Amides of sulfonic acids, i.e. compounds having singly-bound oxygen atoms of sulfo groups replaced by nitrogen atoms, not being part of nitro or nitroso groups**
  
- C07C 311/01 . Sulfonamides having sulfur atoms of sulfonamide groups bound to acyclic carbon atoms
- C07C 311/02 . . of an acyclic saturated carbon skeleton
- C07C 311/03 . . . having the nitrogen atoms of the sulfonamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 311/04 . . . . to acyclic carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms
- C07C 311/05 . . . . to acyclic carbon atoms of hydrocarbon radicals substituted by nitrogen atoms, not being part of nitro or nitroso groups

- C07C 311/06 . . . . to acyclic carbon atoms of hydrocarbon radicals substituted by carboxyl groups
- C07C 311/07 . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 311/08 . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 311/09 . . . the carbon skeleton being further substituted by at least two halogen atoms
- C07C 311/10 . . of a saturated carbon skeleton containing rings
- C07C 311/11 . . of an acyclic unsaturated carbon skeleton
- C07C 311/12 . . of an unsaturated carbon skeleton containing rings
- C07C 311/13 . . . the carbon skeleton containing six-membered aromatic rings
- C07C 311/14 . Sulfonamides having sulfur atoms of sulfonamide groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 311/15 . Sulfonamides having sulfur atoms of sulfonamide groups bound to carbon atoms of six-membered aromatic rings
- C07C 311/16 . . having the nitrogen atom of at least one of the sulfonamide groups bound to hydrogen atoms or to an acyclic carbon atom
- C07C 311/17 . . . to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 311/18 . . . to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 311/19 . . . to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups
- C07C 311/20 . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 311/21 . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 311/22 . Sulfonamides, the carbon skeleton of the acid part being further substituted by singly-bound oxygen atoms
- C07C 311/23 . . having the sulfur atoms of the sulfonamide groups bound to acyclic carbon atoms
- C07C 311/24 . . . of an acyclic saturated carbon skeleton
- C07C 311/25 . . . of a saturated carbon skeleton containing rings
- C07C 311/26 . . . of an acyclic unsaturated carbon skeleton
- C07C 311/27 . . . of an unsaturated carbon skeleton containing rings
- C07C 311/28 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 311/29 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 311/30 . Sulfonamides, the carbon skeleton of the acid part being further substituted by singly-bound nitrogen atoms, not being part of nitro or nitroso groups
- C07C 311/31 . . having the sulfur atoms of the sulfonamide groups bound to acyclic carbon atoms
- C07C 311/32 . . . of an acyclic saturated carbon skeleton

- C07C 311/33 . . . of a saturated carbon skeleton containing rings
- C07C 311/34 . . . of an acyclic unsaturated carbon skeleton
- C07C 311/35 . . . of an unsaturated carbon skeleton containing rings
- C07C 311/36 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 311/37 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 311/38 . . . having sulfur atoms of sulfonamide groups and amino groups bound to carbon atoms of six-membered rings of the same carbon skeleton
- C07C 311/39 . . . . having the nitrogen atom of at least one of the sulfonamide groups bound to hydrogen atoms or to an acyclic carbon atom
- C07C 311/40 . . . . . to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms
- C07C 311/41 . . . . . to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 311/42 . . . . . to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups
- C07C 311/43 . . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 311/44 . . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring
- C07C 311/45 . . at least one of the singly-bound nitrogen atoms being part of any of the groups  , X being a hetero atom, Y being any atom, e.g. N-acylaminosulfonamides
- C07C 311/46 . . . Y being a hydrogen or a carbon atom
- C07C 311/47 . . . Y being a hetero atom
- C07C 311/48 . having nitrogen atoms of sulfonamide groups further bound to another hetero atom
- C07C 311/49 . . to nitrogen atoms
- C07C 311/50 . Compounds containing any of the groups  , X being a hetero atom, Y being any atom
- C07C 311/51 . . Y being a hydrogen or a carbon atom
- C07C 311/52 . . Y being a hetero atom
- C07C 311/53 . . . X and Y not being nitrogen atoms, e.g. N-sulfonylcarbamic acid
- C07C 311/54 . . . either X or Y, but not both, being nitrogen atoms, e.g. N-sulfonylurea
- C07C 311/55 . . . . having sulfur atoms of the sulfonylurea groups bound to acyclic carbon atoms
- C07C 311/56 . . . . having sulfur atoms of the sulfonylurea groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 311/57 . . . . having sulfur atoms of the sulfonylurea groups bound to carbon atoms of six-membered aromatic rings

C07C 311/58	.....	having nitrogen atoms of the sulfonylurea groups bound to hydrogen atoms or to acyclic carbon atoms
C07C 311/59	.....	having nitrogen atoms of the sulfonylurea groups bound to carbon atoms of rings other than six-membered aromatic rings
C07C 311/60	.....	having nitrogen atoms of the sulfonylurea groups bound to carbon atoms of six-membered aromatic rings
C07C 311/61	.....	having nitrogen atoms of the sulfonylurea groups further bound to another hetero atom
C07C 311/62	.....	having nitrogen atoms of the sulfonylurea groups further acylated
C07C 311/63	....	N-sulfonylisoureas
C07C 311/64	...	X and Y being nitrogen atoms, e.g. N-sulfonylguanidine
C07C 311/65	.	N-sulfonylisocyanates
<b>C07C 313/00</b>		<b>Sulfinic acids; Sulfenic acids; Halides, esters or anhydrides thereof; Amides of sulfinic or sulfenic acids, i.e. compounds having singly-bound oxygen atoms of sulfinic or sulfenic groups replaced by nitrogen atoms, not being part of nitro or nitroso groups</b>
C07C 313/02	.	Sulfinic acids; Derivatives thereof
C07C 313/04	..	Sulfinic acids; Esters thereof
C07C 313/06	..	Sulfinamides
C07C 313/08	.	Sulfenic acids; Derivatives thereof
C07C 313/10	..	Sulfenic acids; Esters thereof
C07C 313/12	...	having sulfur atoms of sulfenic groups bound to acyclic carbon atoms
C07C 313/14	...	having sulfur atoms of sulfenic groups bound to carbon atoms of rings other than six-membered aromatic rings
C07C 313/16	...	having sulfur atoms of sulfenic groups bound to carbon atoms of six-membered aromatic rings
C07C 313/18	..	Sulfenamides
C07C 313/20	...	having sulfur atoms of sulfenamide groups bound to acyclic carbon atoms
C07C 313/22	...	having sulfur atoms of sulfenamide groups bound to carbon atoms of rings other than six-membered aromatic rings
C07C 313/24	...	having sulfur atoms of sulfenamide groups bound to carbon atoms of six-membered aromatic rings
C07C 313/26	...	Compounds containing any of the groups $\begin{array}{c} \text{X} \\   \\ \geq \text{C}-\text{S}-\text{N}-\text{C}-\text{Y} \end{array}$ or $\begin{array}{c} \text{X} \\   \\ \geq \text{C}-\text{S}-\text{N}=\text{C}-\text{Y} \end{array}$ , X being a hetero atom, Y being any atom
C07C 313/28	....	Y being a hydrogen or a carbon atom
C07C 313/30	....	Y being a hetero atom
C07C 313/32	.....	X and Y not being nitrogen atoms, e.g. N-sulphenylcarbamic acid
C07C 313/34	.....	either X or Y, but not both, being nitrogen atoms, e.g. N-sulphenylureas
C07C 313/36	...	having nitrogen atoms of sulfenamide groups further bound to other hetero atoms

C07C 313/38 . . . N-sulphenylisocyanates

**C07C 315/00 Preparation of sulfones; Preparation of sulfoxides**

C07C 315/02 . by formation of sulfone or sulfoxide groups by oxidation of sulfides, or by formation of sulfone groups by oxidation of sulfoxides

C07C 315/04 . by reactions not involving the formation of sulfone or sulfoxide groups

C07C 315/06 . Separation; Purification; Stabilisation; Use of additives

**C07C 317/00 Sulfones; Sulfoxides**

C07C 317/02 . having sulfone or sulfoxide groups bound to acyclic carbon atoms

C07C 317/04 . . of an acyclic saturated carbon skeleton

C07C 317/06 . . of a saturated carbon skeleton containing rings

C07C 317/08 . . of an acyclic unsaturated carbon skeleton

C07C 317/10 . . of an unsaturated carbon skeleton containing rings

C07C 317/12 . having sulfone or sulfoxide groups bound to carbon atoms of rings other than six-membered aromatic rings

C07C 317/14 . having sulfone or sulfoxide groups bound to carbon atoms of six-membered aromatic rings

C07C 317/16 . having sulfone or sulfoxide groups and singly-bound oxygen atoms bound to the same carbon skeleton

C07C 317/18 . . with sulfone or sulfoxide groups bound to acyclic carbon atoms of the carbon skeleton

C07C 317/20 . . with sulfone or sulfoxide groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton

C07C 317/22 . . with sulfone or sulfoxide groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton

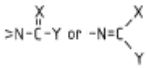
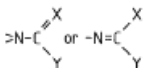
C07C 317/24 . having sulfone or sulfoxide groups and doubly-bound oxygen atoms bound to the same carbon skeleton

C07C 317/26 . having sulfone or sulfoxide groups and nitrogen atoms, not being part of nitro or nitroso groups, bound to the same carbon skeleton

C07C 317/28 . . with sulfone or sulfoxide groups bound to acyclic carbon atoms of the carbon skeleton

C07C 317/30 . . with sulfone or sulfoxide groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton

C07C 317/32 . . with sulfone or sulfoxide groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton

- C07C 317/34 . . . having sulfone or sulfoxide groups and amino groups bound to carbon atoms of six-membered aromatic rings being part of the same non-condensed ring or of a condensed ring system containing that ring
- C07C 317/36 . . . . with the nitrogen atoms of the amino groups bound to hydrogen atoms or to carbon atoms
- C07C 317/38 . . . . with the nitrogen atom of at least one amino group being part of any of the groups , X being a hetero atom, Y being any atom, e.g. N-acylaminosulfones
- C07C 317/40 . . . . . Y being a hydrogen or a carbon atom
- C07C 317/42 . . . . . Y being a hetero atom
- C07C 317/44 . having sulfone or sulfoxide groups and carboxyl groups bound to the same carbon skeleton
- C07C 317/46 . . the carbon skeleton being further substituted by singly-bound oxygen atoms
- C07C 317/48 . . the carbon skeleton being further substituted by singly-bound nitrogen atoms, not being part of nitro or nitroso groups
- C07C 317/50 . . . at least one of the nitrogen atoms being part of any of the groups , X being a hetero atom, Y being any atom
- C07C 319/00 Preparation of thiols, sulfides, hydropolysulfides or polysulfides**
- C07C 319/02 . of thiols
- C07C 319/04 . . by addition of hydrogen sulfide or its salts to unsaturated compounds
- C07C 319/06 . . from sulfides, hydropolysulfides or polysulfides
- C07C 319/08 . . by replacement of hydroxy groups or etherified or esterified hydroxy groups
- C07C 319/10 . . . by replacement of hydroxy groups or etherified or esterified hydroxy groups bound to carbon atoms of six-membered aromatic rings
- C07C 319/12 . . by reactions not involving the formation of mercapto groups
- C07C 319/14 . of sulfides
- C07C 319/16 . . by addition of hydrogen sulfide or its salts to unsaturated compounds
- C07C 319/18 . . by addition of thiols to unsaturated compounds
- C07C 319/20 . . by reactions not involving the formation of sulfide groups
- C07C 319/22 . of hydropolysulfides or polysulfides
- C07C 319/24 . . by reactions involving the formation of sulfur-to-sulfur bonds
- C07C 319/26 . Separation; Purification; Stabilisation; Use of additives
- C07C 319/28 . . Separation; Purification
- C07C 319/30 . . . from the by-products of refining mineral oils

**C07C 321/00 Thiols, sulfides, hydropolysulfides or polysulfides**

- C07C 321/02 . Thiols having mercapto groups bound to acyclic carbon atoms
- C07C 321/04 . . of an acyclic saturated carbon skeleton
- C07C 321/06 . . of a saturated carbon skeleton containing rings
- C07C 321/08 . . of an acyclic unsaturated carbon skeleton
- C07C 321/10 . . of an unsaturated carbon skeleton containing rings
  
- C07C 321/12 . Sulfides, hydropolysulfides, or polysulfides having thio groups bound to acyclic carbon atoms
- C07C 321/14 . . of an acyclic saturated carbon skeleton
- C07C 321/16 . . of a saturated carbon skeleton containing rings
- C07C 321/18 . . of an acyclic unsaturated carbon skeleton
- C07C 321/20 . . of an unsaturated carbon skeleton containing rings
  
- C07C 321/22 . Thiols, sulfides, hydropolysulfides, or polysulfides having thio groups bound to carbon atoms of rings other than six-membered aromatic rings
  
- C07C 321/24 . Thiols, sulfides, hydropolysulfides, or polysulfides having thio groups bound to carbon atoms of six-membered aromatic rings
- C07C 321/26 . . Thiols
- C07C 321/28 . . Sulfides, hydropolysulfides, or polysulfides having thio groups bound to carbon atoms of six-membered aromatic rings
- C07C 321/30 . . . Sulfides having the sulfur atom of at least one thio group bound to two carbon atoms of six-membered aromatic rings
  
- C07C 323/00 Thiols, sulfides, hydropolysulfides or polysulfides substituted by halogen, oxygen or nitrogen atoms, or by sulfur atoms not being part of thio groups**
  
- C07C 323/01 . containing thio groups and halogen atoms, or nitro or nitroso groups bound to the same carbon skeleton
- C07C 323/02 . . having sulfur atoms of thio groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 323/03 . . . the carbon skeleton being acyclic and saturated
- C07C 323/04 . . . the carbon skeleton being saturated and containing rings
- C07C 323/05 . . . the carbon skeleton being acyclic and unsaturated
- C07C 323/06 . . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 323/07 . . . the carbon skeleton containing six-membered aromatic rings
- C07C 323/08 . . having sulfur atoms of thio groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton
- C07C 323/09 . . having sulfur atoms of thio groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton
  
- C07C 323/10 . containing thio groups and singly-bound oxygen atoms bound to the same carbon skeleton

- C07C 323/11      ..      having the sulfur atoms of the thio groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 323/12      ...      the carbon skeleton being acyclic and saturated
- C07C 323/13      ...      the carbon skeleton being saturated and containing rings
- C07C 323/14      ...      the carbon skeleton being acyclic and unsaturated
- C07C 323/15      ...      the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 323/16      ...      the carbon skeleton containing six-membered aromatic rings
- C07C 323/17      ..      having the sulfur atom of at least one of the thio groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton
- C07C 323/18      ..      having the sulfur atom of at least one of the thio groups bound to a carbon atom of a six-membered aromatic ring of the carbon skeleton
- C07C 323/19      ...      with singly-bound oxygen atoms bound to acyclic carbon atoms of the carbon skeleton
- C07C 323/20      ...      with singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring
- C07C 323/21      ...      with the sulfur atom of the thio group bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system
- C07C 323/22      .      containing thio groups and doubly-bound oxygen atoms bound to the same carbon skeleton
- C07C 323/23      .      containing thio groups and nitrogen atoms, not being part of nitro or nitroso groups, bound to the same carbon skeleton
- C07C 323/24      ..      having the sulfur atoms of the thio groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 323/25      ...      the carbon skeleton being acyclic and saturated
- C07C 323/26      ...      the carbon skeleton being saturated and containing rings
- C07C 323/27      ...      the carbon skeleton being acyclic and unsaturated
- C07C 323/28      ...      the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 323/29      ...      the carbon skeleton containing six-membered aromatic rings
- C07C 323/30      ..      having the sulfur atom of at least one of the thio groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton
- C07C 323/31      ..      having the sulfur atom of at least one of the thio groups bound to a carbon atom of a six-membered aromatic ring of the carbon skeleton
- C07C 323/32      ...      having at least one of the nitrogen atoms bound to an acyclic carbon atom of the carbon skeleton
- C07C 323/33      ...      having at least one of the nitrogen atoms bound to a carbon atom of the same non-condensed six-membered aromatic ring
- C07C 323/34      ....      the thio group being a mercapto group
- C07C 323/35      ....      the thio group being a sulfide group
- C07C 323/36      .....      the sulfur atom of the sulfide group being further bound to an acyclic carbon atom
- C07C 323/37      .....      the sulfur atom of the sulfide group being further bound to a carbon atom of a six-membered aromatic ring

- C07C 323/38 . . . with the sulfur atom of the thio group bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system
- C07C 323/39 . . at least one of the nitrogen atoms being part of any of the groups  

$$\begin{array}{c} \text{X} \\ | \\ \text{>N}-\text{C}-\text{Y} \text{ or } -\text{N}=\text{C} \\ | \\ \text{Y} \end{array}$$
, X being a hetero atom, Y being any atom
- C07C 323/40 . . . Y being a hydrogen or a carbon atom
- C07C 323/41 . . . . Y being a hydrogen or an acyclic carbon atom
- C07C 323/42 . . . . Y being a carbon atom of a six-membered aromatic ring
- C07C 323/43 . . . Y being a hetero atom
- C07C 323/44 . . . . X or Y being nitrogen atoms
- C07C 323/45 . . having at least one of the nitrogen atoms doubly-bound to the carbon skeleton
- C07C 323/46 . . having at least one of the nitrogen atoms, not being part of nitro or nitroso groups, further bound to other hetero atoms
- C07C 323/47 . . . to oxygen atoms
- C07C 323/48 . . . to nitrogen atoms
- C07C 323/49 . . . to sulfur atoms
- C07C 323/50 . containing thio groups and carboxyl groups bound to the same carbon skeleton
- C07C 323/51 . . having the sulfur atoms of the thio groups bound to acyclic carbon atoms of the carbon skeleton
- C07C 323/52 . . . the carbon skeleton being acyclic and saturated
- C07C 323/53 . . . the carbon skeleton being saturated and containing rings
- C07C 323/54 . . . the carbon skeleton being acyclic and unsaturated
- C07C 323/55 . . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings
- C07C 323/56 . . . the carbon skeleton containing six-membered aromatic rings
- C07C 323/57 . . . the carbon skeleton being further substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 323/58 . . . . with amino groups bound to the carbon skeleton
- C07C 323/59 . . . . . with acylated amino groups bound to the carbon skeleton
- C07C 323/60 . . . with the carbon atom of at least one of the carboxyl groups bound to nitrogen atoms
- C07C 323/61 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton
- C07C 323/62 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a six-membered aromatic ring of the carbon skeleton
- C07C 323/63 . . . the carbon skeleton being further substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 323/64 . containing thio groups and sulfur atoms, not being part of thio groups, bound to the same carbon skeleton
- C07C 323/65 . . containing sulfur atoms of sulfone or sulfoxide groups bound to the carbon skeleton
- C07C 323/66 . . containing sulfur atoms of sulfo, esterified sulfo or halosulfonyl groups, bound to the carbon skeleton

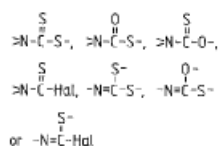
- C07C 323/67 . . containing sulfur atoms of sulfonamide groups, bound to the carbon skeleton
- C07C 325/00 Thioaldehydes; Thioketones; Thioquinones; Oxides thereof**
- C07C 325/02 . Thioketones; Oxides thereof
- C07C 325/04 . Thioquinones; Oxides thereof
- C07C 327/00 Thiocarboxylic acids**
- C07C 327/02 . Monothiocarboxylic acids
- C07C 327/04 . . having carbon atoms of thiocarboxyl groups bound to hydrogen atoms or to acyclic carbon atoms
  - C07C 327/06 . . . to hydrogen atoms or to carbon atoms of an acyclic saturated carbon skeleton
  - C07C 327/08 . . . to carbon atoms of a saturated carbon skeleton containing rings
  - C07C 327/10 . . . to carbon atoms of an acyclic unsaturated carbon skeleton
  - C07C 327/12 . . . to carbon atoms of an unsaturated carbon skeleton containing rings
- C07C 327/14 . . having carbon atoms of thiocarboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 327/16 . . having carbon atoms of thiocarboxyl groups bound to carbon atoms of six-membered aromatic rings
- C07C 327/18 . Dithiocarboxylic acids
- C07C 327/20 . Esters of monothiocarboxylic acids
- C07C 327/22 . . having carbon atoms of esterified thiocarboxyl groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 327/24 . . having carbon atoms of esterified thiocarboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 327/26 . . having carbon atoms of esterified thiocarboxyl groups bound to carbon atoms of six-membered aromatic rings
- C07C 327/28 . . having sulfur atoms of esterified thiocarboxyl groups bound to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms
- C07C 327/30 . . having sulfur atoms of esterified thiocarboxyl groups bound to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 327/32 . . having sulfur atoms of esterified thiocarboxyl groups bound to carbon atoms of hydrocarbon radicals substituted by carboxyl groups
- C07C 327/34 . . . with amino groups bound to the same hydrocarbon radicals
- C07C 327/36 . Esters of dithiocarboxylic acids
- C07C 327/38 . Amides of thiocarboxylic acids
- C07C 327/40 . . having carbon atoms of thiocarboxamide groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 327/42 . . . to hydrogen atoms or to carbon atoms of a saturated carbon skeleton

- C07C 327/44 . . . to carbon atoms of an unsaturated carbon skeleton
- C07C 327/46 . . having carbon atoms of thiocarboxamide groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 327/48 . . having carbon atoms of thiocarboxamide groups bound to carbon atoms of six-membered aromatic rings
- C07C 327/50 . . Compounds containing any of the groups  $\begin{array}{c} \text{S} \quad \text{X} \\ \parallel \quad \parallel \\ -\text{C}-\text{N}-\text{C}-\text{Y} \text{ or } -\text{C}-\text{N}=\text{C} \end{array}$  , X being a hetero atom, Y being any atom
- C07C 327/52 . . . Y being a hydrogen or a carbon atom
- C07C 327/54 . . . Y being a hetero atom
- C07C 327/56 . . having nitrogen atoms of thiocarboxamide groups further bound to another hetero atom
- C07C 327/58 . Derivatives of thiocarboxylic acids, the doubly-bound oxygen atoms being replaced by nitrogen atoms, e.g. imino-thio ethers
- C07C 327/60 . Thiocarboxylic acids having sulfur atoms of thiocarboxyl groups further doubly-bound to oxygen atoms
- C07C 329/00 Thiocarbonic acids; Halides, esters or anhydrides thereof**
- C07C 329/02 . Monothiocarbonic acids; Derivatives thereof
- C07C 329/04 . . Esters of monothiocarbonic acids
- C07C 329/06 . . . having sulfur atoms of thiocarbonic groups bound to acyclic carbon atoms
- C07C 329/08 . . . having sulfur atoms of thiocarbonic groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 329/10 . . . having sulfur atoms of thiocarbonic groups bound to carbon atoms of six-membered aromatic rings
- C07C 329/12 . Dithiocarbonic acids; Derivatives thereof
- C07C 329/14 . . Esters of dithiocarbonic acids
- C07C 329/16 . . . having sulfur atoms of dithiocarbonic groups bound to acyclic carbon atoms
- C07C 329/18 . . . having sulfur atoms of dithiocarbonic groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 329/20 . . . having sulfur atoms of dithiocarbonic groups bound to carbon atoms of six-membered aromatic rings
- C07C 331/00 Derivatives of thiocyanic acid or of isothiocyanic acid**
- C07C 331/02 . Thiocyanates
- C07C 331/04 . . having sulfur atoms of thiocyanate groups bound to acyclic carbon atoms
- C07C 331/06 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 331/08 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of six-membered aromatic rings

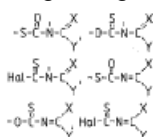
- C07C 331/10 .. having sulfur atoms of thiocyanate groups bound to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms
- C07C 331/12 .. having sulfur atoms of thiocyanate groups bound to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 331/14 .. having sulfur atoms of thiocyanate groups bound to carbon atoms of hydrocarbon radicals substituted by carboxyl groups
- C07C 331/16 . Isothiocyanates
- C07C 331/18 .. having isothiocyanate groups bound to acyclic carbon atoms
- C07C 331/20 ... of a saturated carbon skeleton
- C07C 331/22 ... of an unsaturated carbon skeleton
- C07C 331/24 .... the carbon skeleton containing six-membered aromatic rings
- C07C 331/26 .. having isothiocyanate groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 331/28 .. having isothiocyanate groups bound to carbon atoms of six-membered aromatic rings
- C07C 331/30 .. containing at least two isothiocyanate groups bound to the same carbon skeleton
- C07C 331/32 .. having isothiocyanate groups acylated

**C07C 333/00**

**Derivatives of thiocarbamic acids, i.e. compounds containing any of the groups**  
**, the nitrogen atom not being part of nitro or nitroso groups**



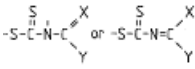
- C07C 333/02 . Monothiocarbamic acids; Derivatives thereof
- C07C 333/04 .. having nitrogen atoms of thiocarbamic groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 333/06 .. having nitrogen atoms of thiocarbamic groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 333/08 .. having nitrogen atoms of thiocarbamic groups bound to carbon atoms of six-membered aromatic rings
- C07C 333/10 .. having nitrogen atoms of thiocarbamic groups being part of any of the groups

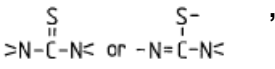


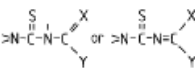
, X being a hetero atom, Y being any atom, e.g., N-acyl-

thiocarbamates

- C07C 333/12 .. having nitrogen atoms of thiocarbamic groups bound to other hetero atoms
- C07C 333/14 . Dithiocarbamic acids; Derivatives thereof
- C07C 333/16 .. Salts of dithiocarbamic acids
- C07C 333/18 .. Esters of dithiocarbamic acids

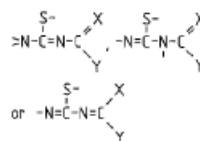
- C07C 333/20 . . . having nitrogen atoms of dithiocarbamate groups bound to hydrogen atoms or to acyclic carbon atoms
- C07C 333/22 . . . having nitrogen atoms of dithiocarbamate groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 333/24 . . . having nitrogen atoms of dithiocarbamate groups bound to carbon atoms of six-membered aromatic rings
- C07C 333/26 . . . containing any of the groups  , X being a hetero atom, Y being any atom, e.g. N-acyldithiocarbamates
- C07C 333/28 . . . having nitrogen atoms of dithiocarbamate groups bound to other hetero atoms
- C07C 333/30 . . . having sulfur atoms of dithiocarbamic groups bound to other sulfur atoms
- C07C 333/32 . . . Thiuramsulfides; Thiurampolysulfides

**C07C 335/00 Thioureas, i.e. compounds containing any of the groups** , the nitrogen atoms not being part of nitro or nitroso groups

- C07C 335/02 . Thiourea
- C07C 335/04 . Derivatives of thiourea
- C07C 335/06 . . having nitrogen atoms of thiourea groups bound to acyclic carbon atoms
- C07C 335/08 . . . of a saturated carbon skeleton
- C07C 335/10 . . . of an unsaturated carbon skeleton
- C07C 335/12 . . . . the carbon skeleton containing six-membered aromatic rings
- C07C 335/14 . . having nitrogen atoms of thiourea groups bound to carbon atoms of rings other than six-membered aromatic rings
- C07C 335/16 . . having nitrogen atoms of thiourea groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton
- C07C 335/18 . . . being further substituted by singly-bound oxygen atoms
- C07C 335/20 . . . being further substituted by nitrogen atoms, not being part of nitro or nitroso groups
- C07C 335/22 . . . being further substituted by carboxyl groups
- C07C 335/24 . . containing any of the groups  , X being a hetero atom, Y being any atom
- C07C 335/26 . . . Y being a hydrogen or a carbon atom, e.g. benzoylthioureas
- C07C 335/28 . . . Y being a hetero atom, e.g. thiobiuret
- C07C 335/30 . Isothioureas
- C07C 335/32 . . having sulfur atoms of isothiourea groups bound to acyclic carbon atoms
- C07C 335/34 . . having sulfur atoms of isothiourea groups bound to carbon atoms of rings other than six-membered aromatic rings

**C07C 335/36** . . having sulfur atoms of isothiourea groups bound to carbon atoms of six-membered aromatic rings

**C07C 335/38** . . containing any of the groups



being any atom

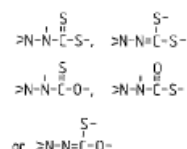
**C07C 335/40** . . having nitrogen atoms of thiourea or isothiourea groups further bound to other hetero atoms

**C07C 335/42** . . Sulfonylthioureas; Sulfonylisothioureas

**C07C 335/44** . . Sulfenylthioureas; Sulfenylisothioureas

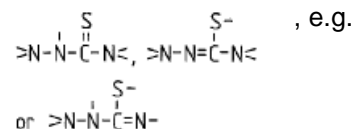
**C07C 337/00** **Derivatives of thiocarbonic acids containing functional groups covered by groups [C07C 333/00](#) or [C07C 335/00](#) in which at least one nitrogen atom of these functional groups is further bound to another nitrogen atom not being part of a nitro or nitroso group**

**C07C 337/02** . . Compounds containing any of the groups



**C07C 337/04** . . the other nitrogen atom being further doubly-bound to a carbon atom

**C07C 337/06** . . Compounds containing any of the groups



thiosemicarbazides

**C07C 337/08** . . the other nitrogen atom being further doubly-bound to a carbon atom, e.g. thiosemicarbazones

**C07C 337/10** . . the two nitrogen atoms of the functional groups being doubly-bound to each other

**C07C 381/00** **Compounds containing carbon and sulfur and having functional groups not covered by groups [C07C 301/00](#) to [C07C 337/00](#)**

**C07C 381/02** . . Thiosulfates

**C07C 381/04** . . Thiosulfonates

**C07C 381/06** . . Compounds containing sulfur atoms only bound to two nitrogen atoms

**C07C 381/08** . . having at least one of the nitrogen atoms acylated

**C07C 381/10** . . Compounds containing sulfur atoms doubly-bound to nitrogen atoms

- C07C 381/12 . Sulfonium compounds
- C07C 381/14 . Compounds containing a carbon atom having four bonds to hetero atoms with a double bond to one hetero atom and at least one bond to a sulfur atom further doubly-bound to oxygen atoms
- C07C 391/00      Compounds containing selenium**
- C07C 391/02 . having selenium atoms bound to carbon atoms of six-membered aromatic rings
- C07C 395/00      Compounds containing tellurium**
- C07C 401/00      Irradiation products of cholesterol or its derivatives; Vitamin D derivatives, 9,10-seco cyclopenta[a]phenanthrene or analogues obtained by chemical preparation without irradiation**
- C07C 403/00      Derivatives of cyclohexane or of a cyclohexene { or of cyclohexadiene}, having a side-chain containing an acyclic unsaturated part of at least four carbon atoms, this part being directly attached to the cyclohexane or cyclohexene { or cyclohexadiene} rings, e.g. vitamin A, beta-carotene, beta-ionone**
- C07C 403/02 . having side-chains containing only carbon and hydrogen atoms
- C07C 403/04 . having side-chains substituted by halogen atoms
- C07C 403/06 . having side-chains substituted by singly-bound oxygen atoms
- C07C 403/08 . . by hydroxy groups
- C07C 403/10 . . by etherified hydroxy groups
- C07C 403/12 . . by esterified hydroxy groups
- C07C 403/14 . having side-chains substituted by doubly-bound oxygen atoms
- C07C 403/16 . . not being part of -CHO groups
- C07C 403/18 . having side-chains substituted by nitrogen atoms
- C07C 403/20 . having side-chains substituted by carboxyl groups { or halides, anhydrides, or (thio)esters thereof}
- C07C 403/22 . having side-chains substituted by sulfur atoms
- C07C 403/24 . having side-chains substituted by six-membered non-aromatic rings, e.g. beta-carotene

- C07C 405/00**      **Compounds containing a five-membered ring having two side-chains in ortho position to each other, and having oxygen atoms directly attached to the ring in ortho position to one of the side-chains, one side-chain containing, not directly attached to the ring, a carbon atom having three bonds to hetero atoms with at the most one to halogen, and the other side-chain having oxygen atoms attached in gamma-position to the ring, e.g. prostaglandins {Analogues or derivatives thereof}**
- C07C 405/0008      . {Analogues having the carboxyl group in the side-chains replaced by other functional groups}
- C07C 405/0016      .. {containing only hydroxy, etherified or esterified hydroxy groups}
- C07C 405/0025      .. {containing keto groups}
- C07C 405/0033      .. {containing sulfur}
- C07C 405/0041      .. {containing nitrogen}
- C07C 405/005      . {Analogues or derivatives having the five membered ring replaced by other rings}
- C07C 405/0058      .. {having the side-chains or their analogues or derivatives attached to a not condensed ring different from a five-membered ring (five-membered ring see 124 CA and sub-groups)}
- C07C 405/0066      ... {to a six-membered ring}
- C07C 405/0075      .. {having the side-chains or their analogues or derivatives attached to a condensed ring system}
- C07C 405/0083      ... {which is only ortho or peri condensed, e.g. carbacyclins}
- C07C 405/0091      ... {which is bridged condensed}
- C07C 407/00**      **Preparation of peroxy compounds**
- C07C 407/003      . {Separation; Purification; Stabilisation; Use of additives}
- C07C 407/006      .. { Stabilisation; Use of additives}
- C07C 409/00**      **Peroxy compounds**
- C07C 409/02      . the -O-O- group being bound between a carbon atom, not further substituted by oxygen atoms, and hydrogen, i.e. hydroperoxides
- C07C 409/04      .. the carbon atom being acyclic
- C07C 409/06      ... Compounds containing rings other than six-membered aromatic rings
- C07C 409/08      ... Compounds containing six-membered aromatic rings
- C07C 409/10      .... Cumene hydroperoxide
- C07C 409/12      .... with two alpha,alpha-dialkylmethyl hydroperoxy groups bound to carbon atoms of the same six-membered aromatic ring
- C07C 409/14      .. the carbon atom belonging to a ring other than a six-membered aromatic ring
- C07C 409/16      . the -O-O- group being bound between two carbon atoms not further substituted by oxygen atoms, i.e. peroxides

- C07C 409/18 . . at least one of the carbon atoms belonging to a ring other than a six-membered aromatic ring
- C07C 409/20 . the -O-O- group being bound to a carbon atom further substituted by singly-bound oxygen atoms
- C07C 409/22 . . having two -O-O- groups bound to the carbon atom
- C07C 409/24 . the -O-O- group being bound between a >C=O group and hydrogen, i.e. peroxy acids
- C07C 409/26 . . Peracetic acid
- C07C 409/28 . . a >C=O group being bound to a carbon atom of a ring other than a six-membered aromatic ring
- C07C 409/30 . . a >C=O group being bound to a carbon atom of a six-membered aromatic ring
- C07C 409/32 . the -O-O- group being bound between two >C=O groups
- C07C 409/34 . . both belonging to carboxylic acids
- C07C 409/36 . . . Diacetyl peroxide
- C07C 409/38 . the -O-O- group being bound between a >C=O group and a carbon atom, not further substituted by oxygen atoms, i.e. esters of peroxy acids
- C07C 409/40 . containing nitrogen atoms
- C07C 409/42 . containing sulfur atoms
- C07C 409/44 . . with sulfur atoms directly bound to the -O-O- groups, e.g. persulfonic acids
- C07C 2521/00 Catalysts comprising the elements, oxides or hydroxides of magnesium, boron, aluminium, carbon, silicon, titanium, zirconium or hafnium**

**NOTE**

The indexing codes of group [C07C 2521/00](#) are associated with groups [C07C 1/00](#) to [C07C 6/00](#).

- C07C 2521/02 . Boron or aluminium; Oxides or hydroxides thereof
- C07C 2521/04 . . Alumina
- C07C 2521/06 . Silicon, titanium, zirconium or hafnium; Oxides or hydroxides thereof
- C07C 2521/08 . . Silica
- C07C 2521/10 . Magnesium; Oxides or hydroxides thereof
- C07C 2521/12 . Silica and alumina
- C07C 2521/14 . Silica and magnesia
- C07C 2521/16 . Clays or other mineral silicates

C07C 2521/18 . Carbon

**C07C 2523/00** **Catalysts comprising metals or metal oxides or hydroxides, not provided for in group [C07C 2521/00](#)([C07C 2521/16](#) takes precedence)**

**NOTE**

The indexing codes of group [C07C 2523/00](#) are associated with groups [C07C 1/00](#) to [C07C 6/00](#).

C07C 2523/02 . of the alkali- or alkaline earth metals or beryllium

C07C 2523/04 . . Alkali metals

C07C 2523/06 . of zinc, cadmium or mercury

C07C 2523/08 . of gallium, indium or thallium

C07C 2523/10 . of rare earths

C07C 2523/12 . of actinides

C07C 2523/14 . of germanium, tin or lead

C07C 2523/16 . of arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium

C07C 2523/18 . . Arsenic, antimony or bismuth

C07C 2523/20 . . Vanadium, niobium or tantalum

C07C 2523/22 . . . Vanadium

C07C 2523/24 . . Chromium, molybdenum or tungsten

C07C 2523/26 . . . Chromium

C07C 2523/28 . . . Molybdenum

C07C 2523/30 . . . Tungsten

C07C 2523/31 . . . combined with bismuth

C07C 2523/32 . . Manganese, technetium or rhenium

C07C 2523/34 . . . Manganese

C07C 2523/36 . . . Rhenium

C07C 2523/38 . of noble metals

C07C 2523/40 . . of the platinum group metals

C07C 2523/42 . . . Platinum

C07C 2523/44 . . . Palladium

C07C 2523/46 . . . Ruthenium, rhodium, osmium or iridium

C07C 2523/48 . . Silver or gold

C07C 2523/50 . . . Silver

<a href="#">C07C 2523/52</a>	...	Gold
<a href="#">C07C 2523/54</a>	..	combined with metals, oxides or hydroxides provided for in groups <a href="#">C07C 2523/02</a> to <a href="#">C07C 2523/36</a>
<a href="#">C07C 2523/56</a>	...	Platinum group metals
<a href="#">C07C 2523/58</a>	....	with alkali- or alkaline earth metals or beryllium
<a href="#">C07C 2523/60</a>	....	with zinc, cadmium or mercury
<a href="#">C07C 2523/62</a>	....	with gallium, indium, thallium, germanium, tin or lead
<a href="#">C07C 2523/63</a>	....	with rare earths or actinides
<a href="#">C07C 2523/64</a>	....	with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2523/644</a>	.....	Arsenic, antimony or bismuth
<a href="#">C07C 2523/648</a>	.....	Vanadium, niobium or tantalum
<a href="#">C07C 2523/652</a>	.....	Chromium, molybdenum or tungsten
<a href="#">C07C 2523/656</a>	.....	Manganese, technetium or rhenium
<a href="#">C07C 2523/66</a>	...	Silver or gold
<a href="#">C07C 2523/68</a>	....	with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2523/70</a>	.	of the iron group metals or copper
<a href="#">C07C 2523/72</a>	..	Copper
<a href="#">C07C 2523/74</a>	..	Iron group metals
<a href="#">C07C 2523/745</a>	...	Iron
<a href="#">C07C 2523/75</a>	...	Cobalt
<a href="#">C07C 2523/755</a>	...	Nickel
<a href="#">C07C 2523/76</a>	..	combined with metals, oxides or hydroxides provided for in groups <a href="#">C07C 2523/02</a> to <a href="#">C07C 2523/36</a>
<a href="#">C07C 2523/78</a>	...	with alkali- or alkaline earth metals or beryllium
<a href="#">C07C 2523/80</a>	...	with zinc, cadmium or mercury
<a href="#">C07C 2523/825</a>	...	with gallium, indium or thallium
<a href="#">C07C 2523/83</a>	...	with rare earths or actinides
<a href="#">C07C 2523/835</a>	...	with germanium, tin or lead
<a href="#">C07C 2523/84</a>	...	with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2523/843</a>	....	Arsenic, antimony or bismuth
<a href="#">C07C 2523/847</a>	....	Vanadium, niobium or tantalum
<a href="#">C07C 2523/85</a>	....	Chromium, molybdenum or tungsten
<a href="#">C07C 2523/86</a>	.....	Chromium
<a href="#">C07C 2523/88</a>	.....	Molybdenum
<a href="#">C07C 2523/881</a>	.....	and iron
<a href="#">C07C 2523/882</a>	.....	and cobalt
<a href="#">C07C 2523/883</a>	.....	and nickel
<a href="#">C07C 2523/885</a>	.....	and copper

- C07C 2523/887 . . . . . containing in addition other metals, oxides or hydroxides provided for in groups [C07C 2523/02](#) to [C07C 2523/36](#)
- C07C 2523/888 . . . . . Tungsten
- C07C 2523/889 . . . . . Manganese, technetium or rhenium
- C07C 2523/89 . . . . . combined with noble metals

## **C07C 2525/00 Catalysts of the Raney type**

### **NOTE**

The indexing codes of group [C07C 2525/00](#) are associated with groups [C07C 1/00](#) to [C07C 6/00](#).

- C07C 2525/02 . . . . . Raney nickel

## **C07C 2527/00 Catalysts comprising the elements or compounds of halogens, sulfur, selenium, tellurium, phosphorus or nitrogen; Catalysts comprising carbon compounds**

### **NOTE**

Metal catalysts or metal oxide catalysts activated or conditioned by halogens, sulfur or phosphorus, or compounds thereof are indexed in the appropriate groups for metal or metal oxide catalysts.

The indexing codes of group [C07C 2527/00](#) are associated with groups [C07C 1/00](#) to [C07C 6/00](#).

- C07C 2527/02 . . . . . Sulfur, selenium or tellurium; Compounds thereof
- C07C 2527/03 . . . . . Acids of sulfur other than sulfhydic acid or sulfuric acid, e.g. halosulfonic acids
- C07C 2527/04 . . . . . Sulfides
- C07C 2527/043 . . . . . with iron group metals or platinum group metals
- C07C 2527/045 . . . . . Platinum group metals
- C07C 2527/047 . . . . . with chromium, molybdenum, tungsten or polonium
- C07C 2527/049 . . . . . with iron group metals or platinum group metals
- C07C 2527/051 . . . . . Molybdenum
- C07C 2527/053 . . . . . Sulfates or other compounds comprising the anion  $(\text{SnO}_{3n+1})^{2-}$
- C07C 2527/054 . . . . . Sulfuric acid or other acids with the formula  $\text{H}_2\text{SnO}_{3n+1}$
- C07C 2527/055 . . . . . with alkali metals, copper, gold or silver
- C07C 2527/057 . . . . . Selenium or tellurium; Compounds thereof
- C07C 2527/06 . . . . . Halogens; Compounds thereof
- C07C 2527/08 . . . . . Halides ([C07C 2527/122](#) to [C07C 2527/138](#) take precedence)
- C07C 2527/10 . . . . . Chlorides
- C07C 2527/11 . . . . . Hydrogen chloride

<a href="#">C07C 2527/12</a>	...	Fluorides
<a href="#">C07C 2527/1206</a>	....	Hydrogen fluoride
<a href="#">C07C 2527/1213</a>	....	Boron fluoride
<a href="#">C07C 2527/122</a>	..	Compounds comprising a halogen and copper
<a href="#">C07C 2527/125</a>	..	Compounds comprising a halogen and scandium, yttrium, aluminium, gallium, indium or thallium
<a href="#">C07C 2527/126</a>	...	Aluminium chloride
<a href="#">C07C 2527/128</a>	..	Compounds comprising a halogen and an iron group metal or a platinum group metal
<a href="#">C07C 2527/13</a>	...	Platinum group metals
<a href="#">C07C 2527/132</a>	..	Compounds comprising a halogen and chromium, molybdenum, tungsten or polonium
<a href="#">C07C 2527/133</a>	..	Compounds comprising a halogen and vanadium, niobium, tantalum, antimony or bismuth
<a href="#">C07C 2527/135</a>	..	Compounds comprising a halogen and titanium, zirconium, hafnium, germanium, tin or lead
<a href="#">C07C 2527/138</a>	..	Compounds comprising a halogen and an alkaline earth metal, magnesium, beryllium, zinc, cadmium or mercury
<a href="#">C07C 2527/14</a>	.	Phosphorus; Compounds thereof
<a href="#">C07C 2527/16</a>	..	containing oxygen
<a href="#">C07C 2527/167</a>	...	Phosphates or other compounds comprising the anion $(\text{PnO}_{3n+1})_{(n+2)-}$
<a href="#">C07C 2527/173</a>	....	Phosphoric acid or other acids with the formula $\text{Hn}+2\text{PnO}_{3n+1}$
<a href="#">C07C 2527/18</a>	...	with metals ( <a href="#">phosphates C07C 2527/167</a> )
<a href="#">C07C 2527/182</a>	..	with silicon
<a href="#">C07C 2527/185</a>	..	with iron group metals or platinum group metals
<a href="#">C07C 2527/186</a>	..	with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2527/187</a>	...	with manganese, technetium or rhenium
<a href="#">C07C 2527/188</a>	...	with chromium, molybdenum, tungsten or polonium
<a href="#">C07C 2527/19</a>	....	Molybdenum
<a href="#">C07C 2527/192</a>	.....	with bismuth
<a href="#">C07C 2527/195</a>	...	with vanadium, niobium or tantalum
<a href="#">C07C 2527/198</a>	....	Vanadium
<a href="#">C07C 2527/199</a>	.....	with chromium, molybdenum, tungsten or polonium
<a href="#">C07C 2527/20</a>	.	Carbon compounds
<a href="#">C07C 2527/22</a>	..	Carbides
<a href="#">C07C 2527/224</a>	...	Silicon carbide
<a href="#">C07C 2527/228</a>	....	with phosphorus, arsenic, antimony or bismuth
<a href="#">C07C 2527/232</a>	..	Carbonates
<a href="#">C07C 2527/236</a>	...	Hydroxy carbonates

- C07C 2527/24 . Nitrogen compounds
- C07C 2527/25 .. Nitrates
- C07C 2527/26 .. Cyanides

## **C07C 2529/00 Catalysts comprising molecular sieves**

### **NOTE**

The indexing codes of group [C07C 2529/00](#) are associated with groups [C07C 1/00](#) to [C07C 6/00](#).

- C07C 2529/03 . not having base-exchange properties
- C07C 2529/035 .. Crystalline silica polymorphs, e.g. silicalites
- C07C 2529/04 . having base-exchange properties, e.g. crystalline zeolites, pillared clays
- C07C 2529/05 .. Pillared clays
- C07C 2529/06 .. Crystalline aluminosilicate zeolites; Isomorphous compounds thereof
- C07C 2529/064 ... containing iron group metals, noble metals or copper
- C07C 2529/068 .... Noble metals
- C07C 2529/072 .... Iron group metals or copper
- C07C 2529/076 ... containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
- C07C 2529/08 ... of the faujasite type, e.g. type X or Y
- C07C 2529/10 .... containing iron group metals, noble metals or copper
- C07C 2529/12 ..... Noble metals
- C07C 2529/14 ..... Iron group metals or copper
- C07C 2529/16 .... containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
- C07C 2529/18 ... of the mordenite type
- C07C 2529/20 .... containing iron group metals, noble metals or copper
- C07C 2529/22 ..... Noble metals
- C07C 2529/24 ..... Iron group metals or copper
- C07C 2529/26 .... containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
- C07C 2529/40 ... of the pentasil type, e.g. types ZSM-5, ZSM-8 or ZSM-11
- C07C 2529/42 .... containing iron group metals, noble metals or copper
- C07C 2529/44 ..... Noble metals
- C07C 2529/46 ..... Iron group metals or copper
- C07C 2529/48 .... containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium

<a href="#">C07C 2529/50</a>	...	of the erionite or offretite type, e.g. zeolite T
<a href="#">C07C 2529/52</a>	....	containing iron group metals, noble metals or copper
<a href="#">C07C 2529/54</a>	.....	Noble metals
<a href="#">C07C 2529/56</a>	.....	Iron group metals or copper
<a href="#">C07C 2529/58</a>	....	containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2529/60</a>	...	of the type L
<a href="#">C07C 2529/61</a>	....	containing iron group metals, noble metals or copper
<a href="#">C07C 2529/62</a>	.....	Noble metals
<a href="#">C07C 2529/63</a>	.....	Iron group metals or copper
<a href="#">C07C 2529/64</a>	....	containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2529/65</a>	...	of the ferrierite type, e.g. types ZSM-21, ZSM-35 or ZSM-38
<a href="#">C07C 2529/66</a>	....	containing iron group metals, noble metals or copper
<a href="#">C07C 2529/67</a>	.....	Noble metals
<a href="#">C07C 2529/68</a>	.....	Iron group metals or copper
<a href="#">C07C 2529/69</a>	....	containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2529/70</a>	...	of types characterised by their specific structure not provided for in groups <a href="#">C07C 2529/08</a> to <a href="#">C07C 2529/65</a>
<a href="#">C07C 2529/72</a>	....	containing iron group metals, noble metals or copper
<a href="#">C07C 2529/74</a>	.....	Noble metals
<a href="#">C07C 2529/76</a>	.....	Iron group metals or copper
<a href="#">C07C 2529/78</a>	....	containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
<a href="#">C07C 2529/80</a>	...	Mixtures of different zeolites
<a href="#">C07C 2529/82</a>	.	Phosphates
<a href="#">C07C 2529/83</a>	..	Aluminophosphates ( <a href="#">APO compounds</a> )
<a href="#">C07C 2529/84</a>	..	Aluminophosphates containing other elements, e.g. metals, boron
<a href="#">C07C 2529/85</a>	...	Silicoaluminophosphates ( <a href="#">SAPO compounds</a> )
<a href="#">C07C 2529/86</a>	.	Borosilicates; Aluminoborosilicates
<a href="#">C07C 2529/87</a>	.	Gallosilicates; Aluminogallosilicates; Galloborosilicates
<a href="#">C07C 2529/88</a>	.	Ferrosilicates; Ferroaluminosilicates
<a href="#">C07C 2529/89</a>	.	Silicates, aluminosilicates or borosilicates of titanium, zirconium or hafnium

**C07C 2531/00****Catalysts comprising hydrides, coordination complexes or organic compounds****NOTE**

The indexing codes of group [C07C 2531/00](#) are associated with groups [C07C 1/00](#) to [C07C 6/00](#).

- [C07C 2531/02](#) . containing organic compounds or metal hydrides
- [C07C 2531/025](#) .. Sulfonic acids
- [C07C 2531/04](#) .. containing carboxylic acids or their salts
- [C07C 2531/06](#) .. containig polymers
- [C07C 2531/08](#) ... Ion-exchange resins
- [C07C 2531/10](#) .... sulfonated
- [C07C 2531/12](#) .. containing organo-metallic compounds or metal hydrides
- [C07C 2531/14](#) ... of aluminium or boron
  
- [C07C 2531/16](#) . containing coordination complexes
- [C07C 2531/18](#) .. containing nitrogen, phosphorus, arsenic or antimony
- [C07C 2531/20](#) .. Carbonyls
- [C07C 2531/22](#) .. Organic complexes
- [C07C 2531/24](#) .. Phosphines
  
- [C07C 2531/26](#) . containing in addition, inorganic metal compounds not provided for in groups [C07C 2531/02](#) to [C07C 2531/24](#)
- [C07C 2531/28](#) .. of the platinum group metals, iron group metals or copper
- [C07C 2531/30](#) ... Halides
- [C07C 2531/32](#) .. of manganese, technetium or rhenium
- [C07C 2531/34](#) .. of chromium, molybdenum or tungsten
- [C07C 2531/36](#) .. of vanadium, niobium or tantalum
- [C07C 2531/38](#) .. of titanium, zirconium or hafnium