

**CPC****COOPERATIVE PATENT CLASSIFICATION****C01C**

**AMMONIA; CYANOGEN; COMPOUNDS THEREOF** ( { metal hydrides, monoborane, diborane or addition complexes thereof [C01B 6/00](#) }; salts of oxyacids of halogens [C01B 11/00](#); peroxides, salts of peroxyacids [C01B 15/00](#); thiosulfates, dithionites, polythionates [C01B 17/64](#); compounds containing selenium or tellurium [C01B 19/00](#); azides [C01B 21/08](#); { compounds other than ammonia or cyanogen, containing nitrogen, non-metals and optionally metals [C01B 21/082](#) }; metal imides or amides [C01B 21/092](#); nitrites [C01B 21/50](#); { compounds of noble gases [C01B 23/0005](#) }; phosphides [C01B 25/08](#); salts of oxyacids of phosphorus [C01B 25/16](#); compounds containing silicon [C01B 33/00](#); compounds containing boron [C01B 35/00](#) )

**C01C 1/00**

**Ammonia; Compounds thereof** { ( [C01C 3/08](#), [C01C 3/14](#), [C01C 3/16](#), [C01C 3/20](#) take precedence ) }

**NOTE**

Complex ammine salts, e.g.  $[\text{Pd}(\text{NH}_3)_4]\text{Cl}_2$ , are { also } classified in the relevant groups of subclasses [C01D](#) to [C01G](#) , according to the metal

- [C01C 1/003](#) . { Storage or handling of ammonia }
- [C01C 1/006](#) .. { making use of solid ammonia storage materials, e.g. complex ammine salts }
- [C01C 1/02](#) . Preparation, { purification } or separation of ammonia
- [C01C 1/022](#) .. { Preparation of aqueous ammonia solutions, i.e. ammonia water }
- [C01C 1/024](#) .. { Purification }
- [C01C 1/026](#) .. { Preparation of ammonia from inorganic compounds }
- [C01C 1/028](#) ... { from ammonium sulfate or sulfite }
- [C01C 1/04](#) .. Preparation of ammonia by synthesis { in the gas phase } ( preparation or purification of gas mixtures for ammonia synthesis { [C01B 3/025](#) } )
- [C01C 1/0405](#) ... { from  $\text{N}_2$  and  $\text{H}_2$  in presence of a catalyst }
- [C01C 1/0411](#) .... { characterised by the catalyst }
- [C01C 1/0417](#) .... { characterised by the synthesis reactor, e.g. arrangement of catalyst beds and heat exchangers in the reactor ( arrangement of several reactors [C01C 1/0405](#); fixed-bed reactors in general [B01J 8/02](#) ) }
- [C01C 1/0423](#) ..... { Cold wall reactors }
- [C01C 1/0429](#) ..... { Fluidized or moving bed reactors }
- [C01C 1/0435](#) ..... { Horizontal reactors }
- [C01C 1/0441](#) ..... { Reactors with the catalyst arranged in tubes }
- [C01C 1/0447](#) .... { Apparatus other than synthesis reactors }
- [C01C 1/0452](#) ..... { Heat exchangers }
- [C01C 1/0458](#) .... { Separation of  $\text{NH}_3$  ( during purge gas treatment [C01C 1/0476](#) ) }
- [C01C 1/0464](#) ..... { by absorption in liquids, e.g. water }
- [C01C 1/047](#) ..... { by condensation }
- [C01C 1/0476](#) .... { Purge gas treatment, e.g. for removal of inert gases or recovery of  $\text{H}_2$  }

- C01C 1/0482 . . . . { Process control; Start-up or cooling-down procedures }
- C01C 1/0488 . . . . { Processes integrated with preparations of other compounds, e.g. methanol, urea or with processes for power generation }
- C01C 1/0494 . . . { using plasma or electric discharge }
- C01C 1/08 . . Preparation of ammonia from nitrogenous organic substances
- C01C 1/083 . . . { from molasses ( treatment of molasses in general [C13J](#) ) }
- C01C 1/086 . . . { from urea }
- C01C 1/10 . . Separation of ammonia from ammonia liquors, e.g. gas liquors { ( as part of the ammonia synthesis process [C01C 1/04](#) ) }
- C01C 1/12 . . Separation of ammonia from gases and vapours { ( as part of the ammonia synthesis process [C01C 1/04](#) ) }
- C01C 1/14 . . . Saturators
- C01C 1/16 . Halides of ammonium
- C01C 1/162 . . { Ammonium fluoride }
- C01C 1/164 . . { Ammonium chloride }
- C01C 1/166 . . { Ammonium bromide }
- C01C 1/168 . . { Ammonium iodide }
- C01C 1/18 . Nitrates of ammonium
- C01C 1/185 . . { Preparation }
- C01C 1/20 . Sulfides; Polysulfides
- C01C 1/22 . Sulfites of ammonium
- C01C 1/24 . Sulfates of ammonium ( [C01C 1/14](#) takes precedence )
- C01C 1/242 . . Preparation from ammonia and sulfuric acid or sulfur trioxide
- C01C 1/244 . . Preparation by double decomposition of ammonium salts with sulfates
- C01C 1/245 . . Preparation from compounds containing nitrogen and sulfur
- C01C 1/246 . . . from sulfur-containing ammonium compounds
- C01C 1/247 . . . . by oxidation with free oxygen
- C01C 1/248 . . Preventing coalescing or controlling form or size of the crystals
- C01C 1/249 . . Deacidifying { or drying } the crystals
- C01C 1/26 . Carbonates or bicarbonates of ammonium
- C01C 1/28 . Methods of preparing ammonium salts in general

**NOTE**

This group does not cover ammonium salts of complex acids (other than complex cyanides) containing a metal in the anion, which are covered by the relevant groups of subclasses [C01D](#) to [C01G](#) , according to the metal.

Salts of polybasic acids with ammonium and a metal as cations are classified as though the ammonium were hydrogen.

**C01C 3/00****Cyanogen; Compounds thereof**

- C01C 3/001 . { Preparation by decomposing nitrogen-containing organic compounds, e.g. molasse waste or urea ( by distillation of carbamates [C01C 3/02](#), [C01C 3/08](#), [C01C 3/14](#), [C01C 3/16](#); by decomposing formamide or ammonium formate [C01C 3/0204](#) ) }
- C01C 3/002 . { Synthesis of metal cyanides or metal cyanamides from elementary nitrogen and carbides }
- C01C 3/003 . { Cyanogen }
- C01C 3/004 . { Halogenides of cyanogen }
- C01C 3/005 . { Thiocyanogen }
- C01C 3/006 . { Sulfurdicyanide }
- C01C 3/007 . { Ammonium cyanide }
- C01C 3/008 . { Cyanazide }
- C01C 3/02 . . Preparation, { separation or purification } of hydrogen cyanide { ( [C01C 3/001](#) takes precedence ) }
- C01C 3/0204 . . . { from formamide or from ammonium formate }
- C01C 3/0208 . . . { Preparation in gaseous phase }
- C01C 3/0212 . . . . { from hydrocarbons and ammonia in the presence of oxygen, e.g. the Andrussov-process }
- C01C 3/0216 . . . . . { characterised by the catalyst used }
- C01C 3/022 . . . . . { Apparatus therefor }
- C01C 3/0225 . . . . . { characterised by the synthesis reactor }
- C01C 3/0229 . . . . { from hydrocarbons and ammonia in the absence of oxygen, e.g. HMA-process }
- C01C 3/0233 . . . . . { making use of fluidised beds, e.g. the Shawinigan-process }
- C01C 3/0237 . . . . { from carbon monoxide and ammonia }
- C01C 3/0241 . . . . { from alcohols or aldehydes }
- C01C 3/0245 . . . . { from organic nitriles, e.g. acetonitrile }
- C01C 3/025 . . . . { by using a plasma }
- C01C 3/0254 . . . . { from cyanates or from thiocyanates }
- C01C 3/0258 . . . . { from cyanamides or derivatives thereof }
- C01C 3/0262 . . . . { from cyanides }
- C01C 3/0266 . . . . { from simple alkali or alkaline earth metal cyanides }
- C01C 3/027 . . . . . { Alkali metal cyanides }
- C01C 3/0275 . . . . . { Alkaline earth metal cyanides }
- C01C 3/0279 . . . . { from ammonium cyanide }
- C01C 3/0283 . . . . { from simple or complex cyanides of the noble metals }
- C01C 3/0287 . . . . { from simple or complex cyanides of other transition metals, e.g. from iron cyanides }
- C01C 3/0291 . . . . { from simple or complex cyanides of other metals }
- C01C 3/0295 . . . { Purification }

- C01C 3/04
  - .. Separation from gases
- C01C 3/06
  - . Stabilisation of hydrogen cyanide
- C01C 3/08
  - . Simple or complex cyanides of metals { ( [C01C 3/001](#), [C01C 3/002](#) take precedence ) }
- C01C 3/10
  - .. Simple alkali metal cyanides
- C01C 3/11
  - .. Complex cyanides
- C01C 3/12
  - .. Simple or complex iron cyanides
- C01C 3/14
  - . Cyanic { or isocyanic } acid; Salts thereof { ( [C01C 3/001](#) takes precedence ) }
- C01C 3/145
  - .. { Isocyanic acid; Salts thereof }
- C01C 3/16
  - . Cyanamide; Salts thereof ( { [C01C 3/001](#), [C01C 3/002](#) takes precedence }; dicyandiamide [C07C 279/28](#) )
- C01C 3/18
  - .. Calcium cyanamide
- C01C 3/20
  - . Thiocyanic acid; Salts thereof { ( [C01C 3/001](#) takes precedence ) }