

# CPC COOPERATIVE PATENT CLASSIFICATION

## C CHEMISTRY; METALLURGY

(NOTES omitted)

### METALLURGY

## C22 METALLURGY; FERROUS OR NON-FERROUS ALLOYS; TREATMENT OF ALLOYS OR NON-FERROUS METALS

### C22C ALLOYS (flints [C06C 15/00](#); treatment of alloys [C21D](#), [C22F](#))

#### NOTES

- In this subclass, the following terms or expressions are used with the meanings indicated:
  - "alloys" includes also:
    - metallic composite materials containing a substantial proportion of fibres or other somewhat larger particles;
    - ceramic compositions containing free metal bonded to carbides, diamond, oxides, borides, nitrides or silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides, other than as macroscopic reinforcing agents;
  - "based on" requires at least 50% by weight of the specified constituent or of the specified group of constituents.
- Groups [C22C 43/00](#) - [C22C 49/00](#) take precedence over groups [C22C 1/00](#) - [C22C 38/00](#).  
{This Note corresponds to IPC Note (1) relating to [C22C 1/00](#) - [C22C 38/00](#).}
- In groups [C22C 37/00](#) and [C22C 38/00](#), the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place that provides for one of the alloying components. {This Note corresponds to IPC Note (1) relating to [C22C 37/00](#) - [C22C 38/00](#).}
- {In this subclass it is desirable to classify the individual aspects of combinations of processes or materials for powder metallurgy using Combination Sets with symbols chosen from groups [C22C 1/00](#) - [C22C 43/00](#) or from groups [B22F 1/00](#) - [B22F 9/00](#).}
- {In this subclass the special database "ALLOYS" is used. This system includes patent documents classified in groups [C22C 1/04](#) and [C22C 5/00](#) - [C22C 49/14](#) and provides information on the composition of the alloys, their uses and characteristics.}

#### WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
 

<a href="#">C22C 101/00</a> , <a href="#">C22C 101/20</a>	covered by	<a href="#">C04B 35/62227</a>
<a href="#">C22C 101/02</a>	covered by	<a href="#">C04B 35/62231</a>
<a href="#">C22C 101/04</a>	covered by	<a href="#">C04B 35/62236</a>
<a href="#">C22C 101/06</a>	covered by	<a href="#">C04B 35/62245</a>
<a href="#">C22C 101/08</a>	covered by	<a href="#">C04B 35/62272</a>
<a href="#">C22C 101/10</a>	covered by	<a href="#">D01F 9/12</a>
<a href="#">C22C 101/12</a>	covered by	<a href="#">C04B 35/62277</a>
<a href="#">C22C 101/14</a>	covered by	<a href="#">C04B 35/62281</a>
<a href="#">C22C 101/16</a>	covered by	<a href="#">C04B 35/62286</a>
<a href="#">C22C 101/18</a>	covered by	<a href="#">C04B 35/62295</a>
<a href="#">C22C 101/22</a>	covered by	<a href="#">C04B 35/6229</a>
<a href="#">C22C 111/00</a> - <a href="#">C22C 111/02</a>	covered by	<a href="#">C22C 47/00</a> , <a href="#">C22C 49/00</a>
<a href="#">C22C 121/00</a> - <a href="#">C22C 121/02</a>	covered by	<a href="#">C22C 47/02</a> - <a href="#">C22C 47/068</a> , <a href="#">C22C 49/00</a>
- In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

#### Non-ferrous alloys, i.e. alloys based essentially on metals other than iron

1/026 . . {Alloys based on aluminium}  
1/03 . . using master alloys

**1/00 Making non-ferrous alloys (by electrothermic methods [C22B 4/00](#); by electrolysis [C25C 1/24](#), [C25C 3/36](#))**

1/007 . {Preparing arsenides or antimonides, especially of the III-VI-compound type, e.g. aluminium or gallium arsenide}

1/02 . by melting {([C22C 1/1036](#) takes precedence)}

1/023 . . {Alloys based on nickel}

- 1/04 . . by powder metallurgy ([C22C 1/08](#) takes precedence)

**WARNING**

Group [C22C 1/04](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/04](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0408 . . {Light metal alloys}

**WARNING**

Group [C22C 1/0408](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0408](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0416 . . . {Aluminium-based alloys}

**WARNING**

Group [C22C 1/0416](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0416](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0425 . . {Copper-based alloys}

**WARNING**

Group [C22C 1/0425](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0425](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0433 . . {Nickel- or cobalt-based alloys}

**WARNING**

Group [C22C 1/0433](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0433](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0441 . . . {Alloys based on intermetallic compounds of the type rare earth - Co, Ni}

**WARNING**

Group [C22C 1/0441](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0441](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/045 . . {Alloys based on refractory metals}

**WARNING**

Group [C22C 1/045](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/045](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0458 . . . {Alloys based on titanium, zirconium or hafnium}

**WARNING**

Group [C22C 1/0458](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0458](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0466 . . {Alloys based on noble metals}

**WARNING**

Group [C22C 1/0466](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0466](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/047 . . comprising intermetallic compounds {([C22C 1/0441](#) takes precedence)}

**WARNING**

Group [C22C 1/047](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/047](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0475 . . {Impregnated alloys}

**WARNING**

Group [C22C 1/0475](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0475](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/0483 . . {Alloys based on the low melting point metals Zn, Pb, Sn, Cd, In or Ga}

**WARNING**

Group [C22C 1/0483](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/0483](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/05 . . Mixtures of metal powder with non-metallic powder ([C22C 1/08](#) takes precedence)

**WARNING**

Group [C22C 1/05](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/05](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/051 . . . Making hard metals based on borides, carbides, nitrides, oxides or silicides; Preparation of the powder mixture used as the starting material therefor

**WARNING**

Group [C22C 1/051](#) is incomplete pending reclassification of documents from group [C22C 1/058](#).

Group [C22C 1/051](#) is also impacted by reclassification into groups [C22C 1/057](#) and [C22C 1/059](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/053 . . . . with *in situ* formation of hard compounds

**WARNING**

Group [C22C 1/053](#) is incomplete pending reclassification of documents from group [C22C 1/058](#).

Group [C22C 1/053](#) is also impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/058](#), [C22C 1/053](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/055 . . . . . using carbon

**WARNING**

Group [C22C 1/055](#) is incomplete pending reclassification of documents from group [C22C 1/058](#).

Group [C22C 1/055](#) is also impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/058](#), [C22C 1/055](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/056 . . . . . using gas

**WARNING**

Group [C22C 1/056](#) is incomplete pending reclassification of documents from group [C22C 1/058](#).

Group [C22C 1/056](#) is also impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/058](#), [C22C 1/056](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/057 . . . . with *in situ* formation of phases other than hard compounds by solid state reaction sintering, e.g. metal phase formed by reduction reaction

**WARNING**

Group [C22C 1/057](#) is incomplete pending reclassification documents from groups [C22C 1/051](#), [C22C 1/058](#), [C22C 1/1078](#), [C22C 1/1084](#) and [C22C 1/1089](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/058 . . . {by reaction sintering (i.e. gasless reaction starting from a mixture of solid metal compounds)}

**WARNING**

Group [C22C 1/058](#) is no longer used for the classification of documents as of January 1, 2023.

The content of this group is being reclassified into groups [C22C 1/051](#) - [C22C 1/057](#) and [C22C 1/059](#).

Groups [C22C 1/058](#), [C22C 1/051](#) - [C22C 1/057](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/059 . . . Making alloys comprising less than 5% by weight of dispersed reinforcing phases

**WARNING**

Group [C22C 1/059](#) is incomplete pending reclassification documents from groups [C22C 1/04](#), [C22C 1/0408](#), [C22C 1/0416](#), [C22C 1/0425](#), [C22C 1/0433](#), [C22C 1/0441](#), [C22C 1/045](#), [C22C 1/0458](#), [C22C 1/0466](#), [C22C 1/047](#), [C22C 1/0475](#), [C22C 1/0483](#), [C22C 1/05](#), [C22C 1/051](#), [C22C 1/053](#), [C22C 1/055](#), [C22C 1/056](#), [C22C 1/058](#), [C22C 1/10](#), [C22C 1/1005](#), [C22C 1/101](#), [C22C 1/1015](#), [C22C 1/1021](#), [C22C 1/1026](#), [C22C 1/1031](#), [C22C 1/1036](#), [C22C 1/1042](#), [C22C 1/1047](#), [C22C 1/1052](#), [C22C 1/1057](#), [C22C 1/1063](#), [C22C 1/1068](#), [C22C 1/1073](#), [C22C 1/1078](#), [C22C 1/1084](#), [C22C 1/1089](#), [C22C 1/1094](#) and [C22C 32/00](#) and all its subgroups.

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/06 . with the use of special agents for refining or deoxidising
- 1/08 . Alloys with open or closed pores
- 1/081 . . {Casting porous metals into porous preform skeleton without foaming}
- 1/082 . . . {with removal of the preform}
- 1/083 . . {Foaming process in molten metal other than by powder metallurgy}
- 1/085 . . . {with external pressure or pressure buildup to make porous metals}
- 1/086 . . . {Gas foaming process}
- 1/087 . . . {after casting in solidified or solidifying metal to make porous metals}
- 1/088 . . {Foaming process with solid metal other than by powder metallurgy}
- 1/10 . Alloys containing non-metals ([C22C 1/05](#), [C22C 1/08](#) take precedence)

**WARNING**

Group [C22C 1/10](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/10](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1005 . . . {Pretreatment of the non-metallic additives  
(pretreatment of non-metallic fibres  
[C22C 47/02](#))}

**WARNING**

Group [C22C 1/1005](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1005](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/101 . . . {by coating}

**WARNING**

Group [C22C 1/101](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/101](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1015 . . . {by preparing or treating a non-metallic additive preform}

**WARNING**

Group [C22C 1/1015](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1015](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1021 . . . . {the preform being ceramic}

**WARNING**

Group [C22C 1/1021](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1021](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1026 . . . {starting from a solution or a suspension of  
(a) compound(s) of at least one of the alloy constituents}

**WARNING**

Group [C22C 1/1026](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1026](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1031 . . . {starting from gaseous compounds or vapours of at least one of the constituents}

**WARNING**

Group [C22C 1/1031](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1031](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1036 . . . {starting from a melt}

**WARNING**

Group [C22C 1/1036](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1036](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1042 . . . {by atomising}

**WARNING**

Group [C22C 1/1042](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1042](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1047 . . . {by mixing and casting liquid metal matrix composites}

**WARNING**

Group [C22C 1/1047](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1047](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1052 . . . . {by mixing and casting metal matrix composites with reaction}

**WARNING**

Group [C22C 1/1052](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1052](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1057 . . . {Reactive infiltration}

**WARNING**

Group [C22C 1/1057](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1057](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1063 . . . . {Gas reaction, e.g. lanxide}

**WARNING**

Group [C22C 1/1063](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1063](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1068 . . . {Making hard metals based on borides, carbides, nitrides, oxides or silicides}

**WARNING**

Group [C22C 1/1068](#) is impacted by reclassification into group [C22C 1/059](#).  
Groups [C22C 1/1068](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1073 . . . {Infiltration or casting under mechanical pressure, e.g. squeeze casting}

**WARNING**

Group [C22C 1/1073](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/1073](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1078 . . . {by internal oxidation of material in solid state}

**WARNING**

Group [C22C 1/1078](#) is impacted by reclassification into groups [C22C 1/057](#) and [C22C 1/059](#).

Groups [C22C 1/1078](#), [C22C 1/057](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1084 . . . {by mechanical alloying (blending, milling)}

**WARNING**

Group [C22C 1/1084](#) is impacted by reclassification into groups [C22C 1/057](#) and [C22C 1/059](#).

Groups [C22C 1/1084](#), [C22C 1/057](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1089 . . . {by partial reduction or decomposition of a solid metal compound}

**WARNING**

Group [C22C 1/1089](#) is impacted by reclassification into groups [C22C 1/057](#) and [C22C 1/059](#).

Groups [C22C 1/1089](#), [C22C 1/057](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/1094 . . . {comprising an after-treatment}

**NOTE**

Documents classified in group [C22C 1/1094](#) are also classified in subclass [C22F](#)

**WARNING**

Group [C22C 1/1094](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 1/1094](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

- 1/11 . Making amorphous alloys  
1/12 . by processing in a semi-solid state, e.g. holding the alloy in the solid-liquid phase

**3/00 Removing material from alloys to produce alloys of different constitution {separation of the constituents of alloys}**

- 3/005 . {Separation of the constituents of alloys}

**5/00 Alloys based on noble metals**

- 5/02 . Alloys based on gold  
5/04 . Alloys based on a platinum group metal

- 5/06 . Alloys based on silver  
5/08 . . with copper as the next major constituent  
5/10 . . with cadmium as the next major constituent

**7/00 Alloys based on mercury**

**9/00 Alloys based on copper**

- 9/01 . with aluminium as the next major constituent  
9/02 . with tin as the next major constituent  
9/04 . with zinc as the next major constituent  
9/05 . with manganese as the next major constituent  
9/06 . with nickel or cobalt as the next major constituent  
9/08 . with lead as the next major constituent  
9/10 . with silicon as the next major constituent

**11/00 Alloys based on lead**

- 11/02 . with an alkali or an alkaline earth metal as the next major constituent  
11/04 . with copper as the next major constituent  
11/06 . with tin as the next major constituent  
11/08 . with antimony or bismuth as the next major constituent  
11/10 . . with tin

**12/00 Alloys based on antimony or bismuth**

**13/00 Alloys based on tin**

- 13/02 . with antimony or bismuth as the next major constituent

**14/00 Alloys based on titanium**

**16/00 Alloys based on zirconium**

**18/00 Alloys based on zinc**

- 18/02 . with copper as the next major constituent  
18/04 . with aluminium as the next major constituent

**19/00 Alloys based on nickel or cobalt**

- 19/002 . {with copper as the next major constituent}  
19/005 . {with Manganese as the next major constituent}  
19/007 . {with a light metal (alkali metal Li, Na, K, Rb, Cs; earth alkali metal Be, Mg, Ca, Sr, Ba, Al Ga, Ge, Ti) or B, Si, Zr, Hf, Sc, Y, lanthanides, actinides, as the next major constituent}  
19/03 . based on nickel  
19/05 . . with chromium  
19/051 . . . {and Mo or W}  
19/052 . . . . {with the maximum Cr content being at least 40%}  
19/053 . . . . {with the maximum Cr content being at least 30% but less than 40%}  
19/055 . . . . {with the maximum Cr content being at least 20% but less than 30%}  
19/056 . . . . {with the maximum Cr content being at least 10% but less than 20%}  
19/057 . . . . {with the maximum Cr content being less 10%}  
19/058 . . . {without Mo and W}  
19/07 . based on cobalt

**20/00 Alloys based on cadmium**

**21/00 Alloys based on aluminium**

**NOTE**

In groups [C22C 21/14](#) - [C22C 21/18](#), the last place priority rule is applied, i.e. at each

C22C 21/00

(continued)

hierarchical level, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place.

{This Note corresponds to IPC Note (1) relating to [C22C 21/14](#) - [C22C 21/18](#).}

- 21/003 . {containing at least 2.6% of one or more of the elements: tin, lead, antimony, bismuth, cadmium, and titanium}
- 21/006 . {containing Hg}
- 21/02 . with silicon as the next major constituent
- 21/04 . . Modified aluminium-silicon alloys
- 21/06 . with magnesium as the next major constituent
- 21/08 . . with silicon
- 21/10 . with zinc as the next major constituent
- 21/12 . with copper as the next major constituent
- 21/14 . . with silicon
- 21/16 . . with magnesium
- 21/18 . . with zinc

**22/00 Alloys based on manganese****23/00 Alloys based on magnesium**

- 23/02 . with aluminium as the next major constituent
- 23/04 . with zinc or cadmium as the next major constituent
- 23/06 . with a rare earth metal as the next major constituent

**24/00 Alloys based on an alkali or an alkaline earth metal****25/00 Alloys based on beryllium****26/00 Alloys containing diamond {or cubic or wurtzitic boron nitride, fullerenes or carbon nanotubes}**

- 2026/001 . {Fullerenes}
- 2026/002 . {Carbon nanotubes}
- 2026/003 . {Cubic boron nitrides only}
- 2026/005 . {with additional metal compounds being borides}
- 2026/006 . {with additional metal compounds being carbides}
- 2026/007 . {with additional metal compounds being nitrides}
- 2026/008 . {with additional metal compounds other than carbides, borides or nitrides}

**27/00 Alloys based on rhenium or a refractory metal not mentioned in groups [C22C 14/00](#) or [C22C 16/00](#)**

- 27/02 . Alloys based on vanadium, niobium, or tantalum
- 27/025 . . {alloys based on vanadium}
- 27/04 . Alloys based on tungsten or molybdenum
- 27/06 . Alloys based on chromium

**28/00 Alloys based on a metal not provided for in groups [C22C 5/00](#) - [C22C 27/00](#)****29/00 Alloys based on carbides, oxides, nitrides, borides, or silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides, sulfides {(C22C 26/00 takes precedence)}**

- 29/005 . {comprising a particular metallic binder}
- 29/02 . based on carbides or carbonitrides
- 29/04 . . based on carbonitrides
- 29/06 . . based on carbides, but not containing other metal compounds
- 29/062 . . . {based on B<sub>4</sub>C}
- 29/065 . . . {based on SiC}
- 29/067 . . . {comprising a particular metallic binder}
- 29/08 . . . based on tungsten carbide
- 29/10 . . . based on titanium carbide

29/12

29/14

29/16

29/18

**30/00**

- . based on oxides
- . based on borides
- . based on nitrides {(containing cubic BN or wurtzitic BN and diamond [C22C 26/00](#))}
- . based on silicides

**Alloys containing less than 50% by weight of each constituent****NOTE**

In groups [C22C 30/02](#) - [C22C 30/06](#), the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place.

{This Note corresponds to IPC Note (1) relating to [C22C 30/02](#) - [C22C 30/06](#).}

30/02

30/04

30/06

- . containing copper
- . containing tin or lead
- . containing zinc

**32/00****Non-ferrous alloys containing at least 5% by weight but less than 50% by weight of oxides, carbides, borides, nitrides, silicides or other metal compounds, e.g. oxynitrides, sulfides, whether added as such or formed *in situ*****NOTE**

This group comprises also dispersion hardened alloys with less than 5% of dispersed compounds

**WARNING**

Group [C22C 32/00](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/00](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/0005

- . {with at least one oxide and at least one of carbides, nitrides, borides or silicides as the main non-metallic constituents}

**WARNING**

Group [C22C 32/0005](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0005](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/001

- . {with only oxides}

**WARNING**

Groups [C22C 32/001](#), [C22C 32/0015](#) and [C22C 32/0021](#) are impacted by reclassification into group [C22C 1/059](#).

All groups listed in this Warning should be considered in order to perform a complete search.

32/0015

- . . {with only single oxides as main non-metallic constituents}

32/0021

- . . . {Matrix based on noble metals, Cu or alloys thereof}



32/0026 . . . {Matrix based on Ni, Co, Cr or alloys thereof}

#### **WARNING**

Group [C22C 32/0026](#) is impacted by reclassification into groups [C22C 1/059](#) and [C22C 33/0261](#).

Groups [C22C 32/0026](#), [C22C 1/059](#) and [C22C 33/0261](#) should be considered in order to perform a complete search.

32/0031 . . . {Matrix based on refractory metals, W, Mo, Nb, Hf, Ta, Zr, Ti, V or alloys thereof}

#### **WARNING**

Group [C22C 32/0031](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0031](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/0036 . . . {Matrix based on Al, Mg, Be or alloys thereof}

#### **WARNING**

Group [C22C 32/0036](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0036](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/0042 . . . {Matrix based on low melting metals, Pb, Sn, In, Zn, Cd or alloys thereof}

#### **WARNING**

Group [C22C 32/0042](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0042](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/0047 . . . {with carbides, nitrides, borides or silicides as the main non-metallic constituents}

#### **WARNING**

Groups [C22C 32/0047](#), [C22C 32/0052](#), [C22C 32/0057](#), [C22C 32/0063](#), [C22C 32/0068](#), [C22C 32/0073](#) and [C22C 32/0078](#) are impacted by reclassification into group [C22C 1/059](#).

All groups listed in this Warning should be considered in order to perform a complete search.

32/0052 . . . {only carbides}

32/0057 . . . {based on B<sub>4</sub>C}

32/0063 . . . {based on SiC}

32/0068 . . . {only nitrides}

32/0073 . . . {only borides}

32/0078 . . . {only silicides}

32/0084 . . . {carbon or graphite as the main non-metallic constituent}

#### **WARNING**

Group [C22C 32/0084](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0084](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/0089 . . . {with other, not previously mentioned inorganic compounds as the main non-metallic constituent, e.g. sulfides, glass}

#### **WARNING**

Group [C22C 32/0089](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0089](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

32/0094 . . . {with organic materials as the main non-metallic constituent, e.g. resin}

#### **WARNING**

Group [C22C 32/0094](#) is impacted by reclassification into group [C22C 1/059](#).

Groups [C22C 32/0094](#) and [C22C 1/059](#) should be considered in order to perform a complete search.

### **Ferrous alloys, i.e. alloys based on iron**

#### **33/00 Making ferrous alloys**

33/003 . . . {making amorphous alloys}

33/006 . . . {compositions used for making ferrous alloys}

33/02 . . . by powder metallurgy ([working metallic powder B22F](#))

33/0207 . . . {Using a mixture of prealloyed powders or a master alloy ([mixtures of metal powder in general B22F 1/09](#))}

33/0214 . . . {comprising P or a phosphorus compound}

33/0221 . . . {comprising S or a sulfur compound}

33/0228 . . . {comprising other non-metallic compounds or more than 5% of graphite}

33/0235 . . . {Starting from compounds, e.g. oxides ([manufacture of articles starting from powder comprising reducible metal compounds in general B22F 3/001](#))}

33/0242 . . . {using the impregnating technique ([impregnating articles in general B22F 3/26](#))}

33/025 . . . {having an intermetallic of the REM-Fe type which is not magnetic}

33/0257 . . . {characterised by the range of the alloying elements}

33/0261 . . . {Matrix based on Fe for ODS steels}

#### **WARNING**

Group [C22C 33/0261](#) is incomplete pending reclassification of documents from group [C22C 32/0026](#).

Groups [C22C 32/0026](#) and [C22C 33/0261](#) should be considered in order to perform a complete search.

33/0264 . . . {the maximum content of each alloying element not exceeding 5%}

33/0271 . . . {with only C, Mn, Si, P, S, As as alloying elements, e.g. carbon steel}

33/0278 . . . {with at least one alloying element having a minimum content above 5%}

33/0285 . . . {with Cr, Co, or Ni having a minimum content higher than 5%}

33/0292 . . . {with more than 5% preformed carbides, nitrides or borides}

33/04 . . . by melting

- 33/06 . . using master alloys
- 33/08 . Making cast-iron alloys
- 33/10 . . including procedures for adding magnesium
- 33/12 . . . by fluidised injection

**35/00 Master alloys for iron or steel**

- 35/005 . {based on iron, e.g. ferro-alloys}

**37/00 Cast-iron alloys**

- 37/04 . containing spheroidal graphite
- 37/06 . containing chromium
- 37/08 . . with nickel
- 37/10 . containing aluminium or silicon

**38/00 Ferrous alloys, e.g. steel alloys (cast-iron alloys C22C 37/00)**

- 38/001 . {containing N}
- 38/002 . {containing In, Mg, or other elements not provided for in one single group C22C 38/001 - C22C 38/60}
- 38/004 . {Very low carbon steels, i.e. having a carbon content of less than 0,01%}
- 38/005 . {containing rare earths, i.e. Sc, Y, Lanthanides}
- 38/007 . {containing silver}
- 38/008 . {containing tin}
- 38/02 . containing silicon
- 38/04 . containing manganese
- 38/06 . containing aluminium
- 38/08 . containing nickel {(C22C 38/105 takes precedence)}
- 38/10 . containing cobalt
- 38/105 . . {containing Co and Ni}
- 38/12 . containing tungsten, tantalum, molybdenum, vanadium, or niobium
- 38/14 . containing titanium or zirconium
- 38/16 . containing copper
- 38/18 . containing chromium
- 38/20 . . with copper
- 38/22 . . with molybdenum or tungsten
- 38/24 . . with vanadium
- 38/26 . . with niobium or tantalum
- 38/28 . . with titanium or zirconium
- 38/30 . . with cobalt
- 38/32 . . with boron
- 38/34 . . with more than 1.5% by weight of silicon
- 38/36 . . with more than 1.7% by weight of carbon
- 38/38 . . with more than 1.5% by weight of manganese
- 38/40 . . with nickel
- 38/42 . . . with copper
- 38/44 . . . with molybdenum or tungsten
- 38/46 . . . with vanadium
- 38/48 . . . with niobium or tantalum
- 38/50 . . . with titanium or zirconium
- 38/52 . . . with cobalt
- 38/54 . . . with boron
- 38/56 . . . with more than 1.7% by weight of carbon
- 38/58 . . . with more than 1.5% by weight of manganese
- 38/60 . containing lead, selenium, tellurium, or antimony, or more than 0.04% by weight of sulfur

**43/00 Alloys containing radioactive materials****45/00 Amorphous alloys (making amorphous non-ferrous alloys C22C 1/11)**

- 45/001 . {with Cu as the major constituent}

- 45/003 . {with one or more of the noble metals as major constituent}
- 45/005 . {with Mg as the major constituent}
- 45/006 . {with Cr as the major constituent}
- 45/008 . {with Fe, Co or Ni as the major constituent (C22C 45/02, C22C 45/04 take precedence)}
- 45/02 . with iron as the major constituent
- 45/04 . with nickel or cobalt as the major constituent
- 45/06 . with beryllium as the major constituent
- 45/08 . with aluminium as the major constituent
- 45/10 . with molybdenum, tungsten, niobium, tantalum, titanium, or zirconium {or Hf} as the major constituent

**Alloys containing fibres or filaments****47/00 Making alloys containing metallic or non-metallic fibres or filaments**

- 2047/005 . {Working of filaments or rods into fibre reinforced metal by mechanical deformation}
- 47/02 . Pretreatment of the fibres or filaments
- 47/025 . . {Aligning or orienting the fibres}
- 47/04 . . by coating, e.g. with a protective or activated covering
- 47/06 . . by forming the fibres or filaments into a preformed structure, e.g. using a temporary binder to form a mat-like element
- 47/062 . . . {from wires or filaments only}
- 47/064 . . . . {Winding wires}
- 47/066 . . . . {Weaving wires}
- 47/068 . . . . {Aligning wires}
- 47/08 . by contacting the fibres or filaments with molten metal, e.g. by infiltrating the fibres or filaments placed in a mould {(C22C 47/16 takes precedence)}
- 47/10 . . Infiltration in the presence of a reactive atmosphere; Reactive infiltration
- 47/12 . . Infiltration or casting under mechanical pressure
- 47/14 . by powder metallurgy, i.e. by processing mixtures of metal powder and fibres or filaments
- 47/16 . by thermal spraying of the metal, e.g. plasma spraying {(atomising molten metal comprising fibres see also C22C 1/1042)}
- 47/18 . . using a preformed structure of fibres or filaments
- 47/20 . by subjecting to pressure and heat an assembly comprising at least one metal layer or sheet and one layer of fibres or filaments
- 2047/205 . . {placing wires inside grooves of a metal layer}

**49/00 Alloys containing metallic or non-metallic fibres or filaments**

- 49/02 . characterised by the matrix material
- 49/04 . . Light metals
- 49/06 . . . Aluminium
- 49/08 . . Iron group metals
- 49/10 . . Refractory metals
- 49/11 . . . Titanium
- 49/12 . . Intermetallic matrix material
- 49/14 . characterised by the fibres or filaments

**2200/00 Crystalline structure**

- 2200/02 . Amorphous
- 2200/04 . Nanocrystalline



## C22C

2200/06 . Quasicrystalline

### Non-ferrous alloys, i.e. alloys based essentially on metals other than iron

2202/00 **Physical properties**

2202/02 . Magnetic

2202/04 . Hydrogen absorbing

2204/00 **End product comprising different layers, coatings or parts of cermet**