SECTION C — CHEMISTRY; METALLURGY

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

C22B PRODUCTION OR REFINING OF METALS (making metallic powder or suspensions thereof B22F 9/00; production of metals by electrolysis or electrophoresis C25); PRETREATMENT OF RAW MATERIALS

Note(s)

In this subclass, groups for obtaining metals include obtaining the metals by non-metallurgical processes, and obtaining metal compounds by metallurgical processes. Thus, for example, group C22B 11/00 covers the production of silver by reduction of ammoniacal silver oxide in solution, and group C22B 17/00 covers the production of cadmium oxide by a metallurgical process. Furthermore, although compounds of arsenic and antimony are classified in C01G, production of the elements themselves is covered by C22B, as well as the production of their compounds by metallurgical processes.

Subclass index

PRETREATMENT OF RAW MATERIALS.....1/00, 4/00, 7/00
PROCESSES FOR OBTAINING METALS.....3/00, 4/00, 5/00
REFINING OR REMELTING METALS.....9/00
OBTAINING SPECIFIC METALS.....11/00-61/00

1/00 Preliminary treatment of ores or scrap [1, 2006.01]

1/02 • Roasting processes (C22B 1/16 takes precedence) **[1, 2006.01]**
1/04 • • Blast roasting **[1, 2006.01]**
1/06 • • Sulfating roasting **[1, 2006.01]**
1/08 • • Chloridising roasting **[1, 2006.01]**
1/10 • • in fluidised form **[1, 2006.01]**
1/11 • Removing sulfur, phosphorus or arsenic, other than by roasting **[2, 2006.01]**
1/14 • Agglomerating; Briquetting; Binding; Granulating **[1, 2006.01]**
1/16 • • Sintering; Agglomerating **[1, 2006.01]**
1/18 • • • in sinter pots **[1, 2006.01]**
1/20 • • • in sintering machines with movable grates **[1, 2006.01]**
1/212 • • • in tunnel furnaces **[2, 2006.01]**
1/214 • • • in shaft furnaces **[2, 2006.01]**
1/216 • • • in rotary furnaces **[2, 2006.01]**
1/22 • • • in other sintering apparatus **[1, 2006.01]**
1/24 • • Binding; Briquetting **[1, 2006.01]**
1/242 • • • with binders **[2, 2006.01]**
1/243 • • • • inorganic **[2, 2006.01]**
1/244 • • • • organic **[2, 2006.01]**
1/245 • • • • • with carbonaceous material for the production of coked agglomerates **[2, 2006.01]**
1/248 • • • of metal scrap or alloys **[2, 2006.01]**
1/26 • Cooling of roasted, sintered, or agglomerated ores **[1, 2006.01]**

3/00 Extraction of metal compounds from ores or concentrates by wet processes [1, 5, 2006.01]

Note(s) [1, 2006.01]

When classifying in this group, the nature of any metal which is considered to represent information of interest for search may also be classified in the main groups only of C22B 11/00-C22B 25/00, in group C22B 19/34 or in any of groups C22B 26/00-C22B 61/00. This can, for example, be the case when it is considered of interest to enable searching for extraction of specific metals or their compounds. Such non-obligatory classification should be given as "additional information".

3/02 • Apparatus therefor **[1, 2006.01]**
3/04 • by leaching (C22B 3/18 takes precedence) **[5, 2006.01]**
3/06 • • in inorganic acid solutions **[5, 2006.01]**
3/08 • • • Sulfuric acid **[5, 2006.01]**
3/10 • • • Hydrochloric acid **[5, 2006.01]**
3/12 • • in inorganic alkaline solutions **[5, 2006.01]**
3/14 • • • containing ammonia or ammonium salts **[5, 2006.01]**
3/16 • • in organic solutions **[5, 2006.01]**
3/18 • with the aid of micro-organisms or enzymes, e.g. bacteria or algae **[5, 2006.01]**
3/20 • Treatment or purification of solutions, e.g. obtained by leaching (C22B 3/18 takes precedence) **[5, 2006.01]**
3/22 • • by physical processes, e.g. by filtration, by magnetic means (C22B 3/26 takes precedence) **[5, 2006.01]**
3/24 • • • by adsorption on solid substances, e.g. by extraction with solid resins **[5, 2006.01]**
3/26 • • by liquid-liquid extraction using organic compounds **[5, 2006.01]**

Note(s) [5]

In groups C22B 3/28-C22B 3/40:

a. the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, compounds are classified in the last appropriate place;

b. when two or more compounds are used successively, each compound is classified as such;

c. mixtures containing two or more compounds covered individually by the same one of groups C22B 3/28-C22B 3/38, are classified only in that group.

3/28 • • • Amines **[5, 2006.01]**
3/30 • • • Oximes **[5, 2006.01]**
3/32 • • • Carboxylic acids **[5, 2006.01]**
3/34 • • • containing sulfur **[5, 2006.01]**
3/36 • • • Heterocyclic compounds (C22B 3/34 takes precedence) **[5, 2006.01]**
3/38 • • • containing phosphorus **[5, 2006.01]**
3/40 • • • Mixtures **[5, 2006.01]**
3/42 • • by ion-exchange extraction **[5, 2006.01]**
3/44 • • by chemical processes (C22B 3/26, C22B 3/42 take precedence) **[5, 2006.01]**
3/46 • • • by substitution, e.g. by cementation **[5, 2006.01]**

4/00 Electrothermal treatment of ores or metallurgical products for obtaining metals or alloys (general methods of refining or remelting metals C22B 9/00; obtaining iron or steel C21B, C21C) **[2, 2006.01]**
4/02 • Light metals **[2, 2006.01]**
4/04 • Heavy metals **[2, 2006.01]**
4/06 • Alloys **[2, 2006.01]**
4/08 • Apparatus **[2, 2006.01]**

5/00 General processes of reducing to metals [1, 2006.01]
5/02 • Dry processes **[1, 2006.01]**
5/04 • • by aluminium, other metals, or silicon **[1, 2006.01]**
5/06 • • by carbides or the like **[1, 2006.01]**
5/08 • • by sulfides; Roasting reaction processes **[1, 2006.01]**
5/10 • • by solid carbonaceous reducing agents **[1, 2006.01]**
5/12 • • by gases **[1, 2006.01]**
5/14 • • • fluidised material **[1, 2006.01]**
5/16 • • with volatilisation or condensation of the metal being produced **[1, 2006.01]**
5/18 • • Reducing step-by-step **[1, 2006.01]**
5/20 • • from metal carbonyls **[1, 2006.01]**

7/00 Working-up raw materials other than ores, e.g. scrap, to produce non-ferrous metals or compounds thereof [1, 2006.01]
7/02 • Working-up flue dust **[1, 2006.01]**
7/04 • Working-up slag **[1, 2006.01]**

9/00 General processes of refining or remelting of metals; Apparatus for electroslag or arc remelting of metals [1, 2006.01]
9/02 • Refining by liquating, filtering, centrifuging, distilling or supersonic wave action **[1, 2006.01]**
9/04 • Refining by applying a vacuum **[1, 3, 2006.01]**
9/05 • Refining by treating with gases, e.g. gas flushing **[3, 2006.01]**
9/10 • with refining or fluxing agents; Use of materials therefor (C22B 9/18 takes precedence) **[1, 3, 2006.01]**
9/14 • Refining in the solid state **[1, 2006.01]**
9/16 • Remelting metals (liquating C22B 9/02) **[3, 2006.01]**
9/18 • • Electroslag remelting **[3, 2006.01]**
9/187 • • • Apparatus therefor, e.g. furnaces **[5, 2006.01]**
9/193 • • • • Moulds, bottom plates or starter plates **[5, 2006.01]**
9/20 • • Arc remelting **[3, 2006.01]**
9/21 • • • Apparatus therefor **[5, 2006.01]**
9/22 • • with heating by wave energy or particle radiation **[3, 2006.01]**

11/00 Obtaining noble metals [1, 2006.01]
11/02 • by dry processes **[1, 2006.01]**
11/06 • Chloridising **[1, 2006.01]**
11/08 • by cyaniding **[1, 2006.01]**
11/10 • by amalgamating **[1, 2006.01]**
11/12 • • Apparatus therefor **[1, 2006.01]**

13/00 Obtaining lead [1, 2006.01]
13/02 • by dry processes **[1, 2006.01]**
13/06 • Refining **[1, 2006.01]**
13/08 • • Separating metals from lead by precipitating, e.g. by Parkes process **[1, 2006.01]**
13/10 • • Separating metals from lead by crystallising, e.g. by Pattison process **[1, 2006.01]**

15/00 Obtaining copper [1, 2006.01]
15/02 • in blast furnaces **[1, 2006.01]**
15/04 • in reverberatory furnaces **[1, 2006.01]**
15/06 • in converters **[1, 2006.01]**
15/14 • Refining **[1, 2006.01]**

17/00 Obtaining cadmium [1, 2006.01]
17/02 • by dry processes **[1, 2006.01]**
17/06 • Refining **[1, 2006.01]**

19/00 Obtaining zinc or zinc oxide [1, 2006.01]
19/02 • Preliminary treatment of ores; Preliminary refining of zinc oxide **[1, 2006.01]**
19/04 • Obtaining zinc by distilling **[1, 2006.01]**
19/06 • • in muffle furnaces **[1, 2006.01]**
19/08 • • in blast furnaces **[1, 2006.01]**
19/10 • • in reverberatory furnaces **[1, 2006.01]**
19/12 • • in crucible furnaces **[1, 2006.01]**
19/14 • • in vertical retorts **[1, 2006.01]**
19/16 • • Distilling vessels **[1, 2006.01]**
19/18 • • • Condensers; Receiving vessels **[1, 2006.01]**
19/20 • Obtaining zinc otherwise than by distilling **[1, 2006.01]**
19/28 • from muffle furnace residues **[1, 2006.01]**
19/30 • from metallic residues or scraps **[1, 2006.01]**
19/32 • Refining zinc **[1, 2006.01]**
19/34 • Obtaining zinc oxide (purifying zinc oxide C01G 9/02) **[1, 2006.01]**
19/36 • • in blast or reverberatory furnaces **[1, 2006.01]**
19/38 • • in rotary furnaces **[1, 2006.01]**

21/00 Obtaining aluminium [1, 2006.01]
21/02 • with reducing **[1, 2006.01]**
21/04 • with alkali metals **[1, 2006.01]**
21/06 • Refining **[1, 2006.01]**

23/00 Obtaining nickel or cobalt [1, 2006.01]

23/02 • by dry processes **[1, 2006.01]**
23/06 • Refining **[1, 2006.01]**

25/00 Obtaining tin [1, 2006.01]
25/02 • by dry processes **[1, 2006.01]**
25/06 • from scrap, especially tin scrap (by electrolytic process C25C 1/14) **[1, 2006.01]**
25/08 • Refining **[1, 2006.01]**

26/00 Obtaining alkali, alkaline earth metals or magnesium [2, 2006.01]
26/10 • Obtaining alkali metals **[2, 2006.01]**
26/12 • • Obtaining lithium **[2, 2006.01]**
26/20 • Obtaining alkaline earth metals or magnesium **[2, 2006.01]**
26/22 • • Obtaining magnesium **[2, 2006.01]**

30/00 Obtaining antimony, arsenic or bismuth [2, 2006.01]
30/02 • Obtaining antimony **[2, 2006.01]**
30/04 • Obtaining arsenic **[2, 2006.01]**
30/06 • Obtaining bismuth **[2, 2006.01]**

34/00 Obtaining refractory metals [2, 2006.01]
34/10 • Obtaining titanium, zirconium or hafnium **[2, 2006.01]**
34/12 • • Obtaining titanium **[2, 2006.01]**
34/14 • • Obtaining zirconium or hafnium **[2, 2006.01]**
34/20 • Obtaining niobium, tantalum or vanadium **[2, 2006.01]**
34/22 • • Obtaining vanadium **[2, 2006.01]**
34/24 • • Obtaining niobium or tantalum **[2, 2006.01]**
34/30 • Obtaining chromium, molybdenum or tungsten **[2, 2006.01]**
34/32 • • Obtaining chromium **[2, 2006.01]**
34/34 • • Obtaining molybdenum **[2, 2006.01]**
34/36 • • Obtaining tungsten **[2, 2006.01]**

35/00 Obtaining beryllium [1, 2006.01]

41/00 Obtaining germanium [1, 2006.01]

43/00 Obtaining mercury [1, 2006.01]

47/00 Obtaining manganese [1, 2006.01]

58/00 Obtaining gallium or indium [2, 2006.01]

59/00 Obtaining rare earth metals [1, 2006.01]

60/00 Obtaining metals of atomic number 87 or higher, i.e. radioactive metals [2, 2006.01]
60/02 • Obtaining thorium, uranium or other actinides **[2, 2006.01]**
60/04 • • Obtaining plutonium **[2, 2006.01]**

61/00 Obtaining metals not elsewhere provided for in this subclass (iron C21) **[1, 2, 2006.01]**