

CPC**COOPERATIVE PATENT CLASSIFICATION****C23F**

NON-MECHANICAL REMOVAL OF METALLIC MATERIAL FROM SURFACE (working metal by laser beams [B23K 26/00](#); desurfacing by applying flames [B23K 7/00](#); working of metal by electro-erosion [B23H](#) ; producing decorative effects by removing surface material, e.g. by engraving, by etching, [B44C 1/22](#); electrolytic etching or polishing [C25F](#)) ; **INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL; MULTI-STEP PROCESSES FOR SURFACE TREATMENT OF METALLIC MATERIAL INVOLVING AT LEAST ONE PROCESS PROVIDED FOR IN CLASS [C23](#) AND AT LEAST ONE PROCESS COVERED BY SUBCLASS [C21D](#) OR [C22F](#) OR CLASS [C25](#) .**

NOTE

protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. [B05](#) , [B44](#) , [C09D](#) , [C23C](#) .

mechanical devices or constructional features of particular articles for inhibiting incrustation; these are classified in the appropriate places, e.g. in pipes or pipe fittings [F16L 58/00](#).

articles characterised by being made of materials selected for their properties of resistance to corrosion or incrustation; these are classified in the appropriate places, e.g. turbine blades [F01D 5/28](#).

C23F 1/00

Etching metallic material by chemical means (manufacture of printing surfaces [B41C](#) ; manufacture of printed circuits [H05K](#))

C23F 1/02

. Local etching

C23F 1/04

.. Chemical milling

C23F 1/06

. Sharpening files

C23F 1/08

. Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction [G03F](#))

C23F 1/10

. Etching compositions ([C23F 1/44](#) takes precedence)

C23F 1/12

.. Gaseous compositions

C23F 1/14

.. Aqueous compositions

C23F 1/16

... Acidic compositions ([C23F 1/42](#) takes precedence)

C23F 1/18

.... for etching copper or alloys thereof

C23F 1/20

.... for etching aluminium or alloys thereof

C23F 1/22

.... for etching magnesium or alloys thereof

C23F 1/26

.... for etching refractory metals

C23F 1/28

.... for etching iron group metals

C23F 1/30

.... for etching other metallic material

C23F 1/32

... Alkaline compositions ([C23F 1/42](#) takes precedence)

- C23F 1/34 for etching copper or alloys thereof
- C23F 1/36 for etching aluminium or alloys thereof
- C23F 1/38 for etching refractory metals
- C23F 1/40 for etching other metallic material
- C23F 1/42 containing a dispersed water-immiscible liquid

C23F 1/44 . Compositions for etching metallic material from a metallic material substrate of different composition

C23F 1/46 . Regeneration of etching compositions

C23F 3/00 Brightening metals by chemical means

C23F 3/02 . Light metals

C23F 3/03 . . with acidic solutions

C23F 3/04 . Heavy metals

C23F 3/06 . . with acidic solutions

C23F 4/00 Processes for removing metallic material from surfaces, not provided for in group [C23F 1/00](#) or [C23F 3/00](#)

C23F 4/02 . by evaporation

C23F 4/04 . by physical dissolution

C23F 11/00 Inhibiting corrosion of metallic material by applying inhibitors to the surface in danger of corrosion or adding them to the corrosive agent (adding inhibitors to mineral oil, fuels, or lubricants [C10](#) ; adding inhibitors to pickling solutions [C23G](#))

C23F 11/02 . in air or gases by adding vapour phase inhibitors

C23F 11/04 . in markedly acid liquids

C23F 11/06 . in markedly alkaline liquids

C23F 11/08 . in other liquids

C23F 11/10 . . using organic inhibitors

NOTE

A compound is classified in the last appropriate place.

Esters or anhydrides of organic acids are classified as the relevant acid unless otherwise indicated. Salts of a compound with an inorganic compound are classified as that compound unless specifically provided for.

C23F 11/12 . . . Oxygen-containing compounds

C23F 11/122 Alcohols; Aldehydes; Ketones

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|--------------|-------|---|
| C23F 11/124 | | Carboxylic acids |
| C23F 11/126 | | Aliphatic acids |
| C23F 11/128 | | Esters of carboxylic acids |
| C23F 11/14 | ... | Nitrogen containing compounds |
| C23F 11/141 | .... | Amines; Quaternary ammonium compounds |
| C23F 11/142 | ..... | Hydroxy amines |
| C23F 11/143 | ..... | Salts of amines |
| C23F 11/144 | .... | Aminocarboxylic acids |
| C23F 11/145 | .... | Amides; N-substituted amides |
| C23F 11/146 | .... | containing a multiple nitrogen-to-carbon bond |
| C23F 11/147 | .... | containing a nitrogen-to-oxygen bond |
| C23F 11/148 | .... | containing a nitrogen-to-nitrogen bond |
| C23F 11/149 | .... | Heterocyclic compounds containing nitrogen as hetero atom |
| C23F 11/16 | ... | Sulfur containing compounds |
| C23F 11/161 | .... | Mercaptans |
| C23F 11/162 | .... | Thioaldehydes; Thioketones |
| C23F 11/163 | .... | Sulfonic acids |
| C23F 11/164 | .... | containing a -SO ₂ -N group |
| C23F 11/165 | .... | Heterocyclic compounds containing sulfur as hetero atom |
| C23F 11/167 | ... | Phosphorus-containing compounds |
| C23F 11/1673 | .... | Esters of phosphoric or thiophosphoric acids |
| C23F 11/1676 | .... | Phosphonic acids |
| C23F 11/173 | ... | Macromolecular compounds |
| C23F 11/18 | .. | using inorganic inhibitors |
| C23F 11/181 | ... | Nitrogen containing compounds |
| C23F 11/182 | ... | Sulfur, boron or silicon containing compounds |
| C23F 11/184 | ... | Phosphorous, arsenic, antimony or bismuth containing compound |
| C23F 11/185 | ... | Refractory metal-containing compounds |
| C23F 11/187 | ... | Mixtures of inorganic inhibitors |
| C23F 11/188 | .... | containing phosphates |

C23F 13/00 Inhibiting corrosion of metals by anodic or cathodic protection

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|-------------|------|--|
| C23F 13/005 | . | {Anodic protection } |
| C23F 13/02 | . | cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions |
| C23F 13/04 | .. | Controlling or regulating desired parameters |
| C23F 13/06 | .. | Constructional parts, or assemblies of cathodic-protection apparatus |
| C23F 13/08 | ... | Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto |
| C23F 13/10 | .... | Electrodes characterised by the structure (C23F 13/16 takes precedence) |
| C23F 13/12 | | Electrodes characterised by the material (C23F 13/16 takes precedence) |

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|---------------------|-------|--|
| C23F 13/14 | | Material for sacrificial anodes |
| C23F 13/16 | | Electrodes characterised by the combination of the structure and the material |
| C23F 13/18 | .... | Means for supporting electrodes |
| C23F 13/20 | .... | Conducting electric current to electrodes |
| C23F 13/22 | .... | Monitoring arrangements therefor |
| C23F 14/00 | | Inhibiting incrustation in apparatus for heating liquids for physical or chemical purposes (adding scale preventives or removers to water C02F 5/00) {inhibiting incrustation in polymerisation reactors C23F 15/005 } |
| C23F 14/02 | . | by chemical means |
| C23F 15/00 | | Other methods of preventing corrosion or incrustation |
| C23F 15/005 | . | {Inhibiting incrustation } |
| C23F 17/00 | | Multi-step processes for surface treatment of metallic material involving at least one process provided for in class C23 and at least one process covered by subclass C21D or C22F or class C25 (C23C 28/00 takes precedence) |
| C23F 2201/00 | | Type of materials to be protected by cathodic protection |
| C23F 2201/02 | . | Concrete, e.g. reinforced |
| C23F 2213/00 | | Aspects of inhibiting corrosion of metals by anodic or cathodic protection |
| C23F 2213/10 | . | Controlling or regulating parameters |
| C23F 2213/11 | .. | for structures subject to stray currents |
| C23F 2213/20 | . | Constructional parts or assemblies of the anodic or cathodic protection apparatus |
| C23F 2213/21 | .. | combining at least two types of anodic or cathodic protection |
| C23F 2213/22 | .. | characterized by the ionic conductor, e.g. humectant, hydratant or backfill |
| C23F 2213/30 | . | Anodic or cathodic protection specially adapted for a specific object |
| C23F 2213/31 | .. | Immersed structures, e.g. submarine structures |
| C23F 2213/32 | .. | Pipes |