CPC COOPERATIVE PATENT CLASSIFICATION

C CHEMISTRY; METALLURGY

(NOTES omitted)

CHEMISTRY

C09 DYES; PAINTS; POLISHES; NATURAL RESINS; ADHESIVES; COMPOSITIONS NOT OTHERWISE PROVIDED FOR; APPLICATIONS OF MATERIALS NOT OTHERWISE PROVIDED FOR

C09C TREATMENT OF INORGANIC MATERIALS, OTHER THAN FIBROUS FILLERS, TO ENHANCE THEIR PIGMENTING OR FILLING PROPERTIES (treatment of materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone C04B 14/00, C04B 18/00, C04B 20/00); PREPARATION OF CARBON BLACK {; PREPARATION OF INORGANIC MATERIALS WHICH ARE NO SINGLE CHEMICAL COMPOUNDS AND WHICH ARE MAINLY USED AS PIGMENTS OR FILLERS}

NOTES

1. In this subclass, in the absence of an indication to the contrary, a compound is classified in the last appropriate place
2. Treatment by polymerisation onto particle is classified in C08F 292/00. Only treatment by already polymerised agents is classified in C09C
3. Whenever in groups C09C 1/00 - C09C 1/66 the materials consist of a particulate core bearing a coating or any other deposit, classification is done only according to the composition of the core, unless otherwise stated, e.g. C09C 1/0015, C09C 1/0078
4. Preparations of those materials which are no single chemical compounds comprise those of many ceramic pigments (C09C 1/0009), consisting of solid solutions or polycristalline structures, and those defined as composite materials (C09C 1/0081)
5. Preparation and treatment steps are not always easy to distinguish from each other, e.g. preparation in the presence of treating agents (by precipitation or calcination), precise reacting conditions, affecting pigmentary effects. It is common practice to include these complex topics in C09C 1/00 while avoiding redundancy
6. When classifying in this subclass, the indexing codes of subclass C01P are used to identify structural or physical aspects of solid inorganic compounds

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   C09C 1/68 covered by C09K 3/14
2. {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.}

1/00 **Treatment of specific inorganic materials other than fibrous fillers** (tenebrescent materials C09K 9/00; luminescent materials C09K 11/00); **Preparation of carbon black**

1/0003 . {Compounds of molybdenum (C09C 1/0015 takes precedence)}

1/0006 . {containing bismuth and vanadium (C09C 1/0015 takes precedence)}

1/0009 . {Pigments for ceramics (C09C 1/0015, C09C 1/0078 take precedence)}

1/0012 . . {containing zirconium and silicon}

1/0015 . {Pigments exhibiting interference colours, e.g. transparent platelets of appropriate thinness or flaky substrates, e.g. mica, bearing appropriate thin transparent coatings}

NOTES

1. {The optical properties of the interference pigments are depending on the order of the different layers applied on the substrate in view of their refractive indices; A refractive index < or = 1.8 is considered low, a refractive index >1.8 is considered high; A dye is always an organic, coloured material. An aluminium lake compound would for classification purposes also fall under this definition, as well as any coloured metal chelate or metal complex with organic ligands; An interference pigment can e.g. have a flaky, spherical or ellipsoidal core; A pigment

C09C 1/0015 (continued)

comprising a core consisting of a metal is only considered as an interference pigment if it shows properties typical for interference pigments}

2. In groups C09C 1/0015 - C09C 1/0075 it is desirable to add indexing codes relating to the compositional and structural details chosen from groups C09C 2200/00 - C09C 2220/20

1/0018 . . {uncoated and unlayered plate-like particles}
1/0021 . . {comprising a core coated with only one layer having a high or low refractive index}
1/0024 . . {comprising a stack of coating layers with alternating high and low refractive indices, wherein the first coating layer on the core surface has the high refractive index}
1/0027 . . . {One layer consisting of at least one sub-stoichiometric inorganic compound}
1/003 . . . {comprising at least one light-absorbing layer}
1/0033 . . . . {consisting of a metal or an alloy}
1/0036 . . . . {consisting of at least one dye}
1/0039 . . . . {consisting of at least one coloured inorganic material}
1/0042 . . . . . {Sub-stoichiometric inorganic materials}
1/0045 . . . . {consisting of a carbonaceous material, e.g. carbon black, graphite, SWNT, MWNT incorporated within an inorganic material}
1/0048 . . . {comprising at least one optically active layer with at least one organic material layer, e.g. liquid crystal polymers}
1/0051 . . {comprising a stack of coating layers with alternating low and high refractive indices, wherein the first coating layer on the core surface has the low refractive index}
1/0054 . . . {one layer consisting of at least one sub-stoichiometric inorganic compound}
1/0057 . . . {comprising at least one light-absorbing layer}
1/006 . . . . {consisting of a metal or an alloy}
1/0063 . . . . {consisting of at least one dye}
1/0066 . . . . {consisting of at least one coloured inorganic material}
1/0069 . . . . . {Sub-stoichiometric inorganic materials}
1/0072 . . . . {consisting of a carbonaceous material, e.g. carbon black, graphite, SWNT, MWNT incorporated within an inorganic material}
1/0075 . . . {comprising at least one optically active layer with at least one organic material layer, e.g. liquid crystal polymers}
1/0078 . {Pigments consisting of flaky, non-metallic substrates, characterised by a surface-region containing free metal}
1/0081 . {Composite particulate pigments or fillers, i.e. containing at least two solid phases, except those consisting of coated particles of one compound (C09C 1/0015, C09C 1/0078 take precedence)}
1/0084 . . {containing titanium dioxide}
1/0087 . . . {only containing titanium dioxide and silica or silicate}
1/009 . . {whose phases only contain calcium, magnesium and carbonate ions and may contain hydroxyl ions}
1/0093 . . {whose phases only contain calcium ions, carbonate ions and silicate ions or silica}
1/0096 . {Compounds of antimony (C09C 1/0015, C09C 1/0078 take precedence)}
1/02 . Compounds of alkaline earth metals or magnesium {(C09C 1/0003, C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence; dolomitic solids C09C 1/009)}
1/021 . . {Calcium carbonates}
1/022 . . . {Treatment with inorganic compounds}
1/024 . . . . {Coating}
1/025 . . {Calcium sulfates}
1/027 . . {Barium sulfates}
1/028 . . {Compounds containing only magnesium as metal}
1/04 . Compounds of zinc {(C09C 1/0003, C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}
1/043 . . {Zinc oxide}
1/046 . . {containing phosphorus}
1/06 . . Lithopone
1/08 . . Zinc chromate
1/10 . Compounds of cadmium {(C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}
1/12 . . Cadmium sulfoselenide
1/14 . Compounds of lead {(C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}
1/16 . . White lead
1/18 . . Red lead
1/20 . . Lead chromate
1/22 . Compounds of iron {(C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}
1/24 . . Oxides of iron
1/245 . . . {of plate-like shape}
1/26 . . Iron blues
1/28 . Compounds of silicon {(C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}
1/30 . . Silicic acid

NOTES

1. Combinations of treatment steps, characterised by the sequence or the nature of two or more individual steps, are classified in C09C 1/309.
2. The individual steps are classified with symbols chosen from groups C09C 1/3009 - C09C 1/3081.

1/3009 . . . {Physical treatment, e.g. grinding; treatment with ultrasonic vibrations}
1/3018 . . . . {Grinding}
1/3027 . . . . {Drying, calcination}
1/3036 . . . . {Agglomeration, granulation, pelleting}
1/3045 . . . {Treatment with inorganic compounds}
1/3054 . . . . {Coating}
1/3063 . . . {Treatment with low-molecular organic compounds}
1/3072 . . . {Treatment with macro-molecular organic compounds}
1/3081 . . . {Treatment with organo-silicon compounds}
1/309 . . . {Combinations of treatments provided for in groups C09C 1/3009 - C09C 1/3081}
1/32 . . Ultramarine
1/34 . Compounds of chromium {(C09C 1/0009, C09C 1/0015, C09C 1/0078, C09C 1/08, C09C 1/20 take precedence)}
1/343 . . {containing silicon or associated with silicon containing material, except when silicon only occurs in a thin coating of the particles}
1/346 . . {Chromium oxides}

1/36 . Compounds of titanium {(C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}

1/3607 . . {Titanium dioxide}

NOTES

1. Combinations of treatment steps, characterised by the sequence or the nature of two or more individual steps, are classified in C09C 1/3692.
2. The individual steps are classified with symbols chosen from groups C09C 1/3615 - C09C 1/3684.

1/3615 . . . {Physical treatment, e.g. grinding, treatment with ultrasonic vibrations}

1/3623 . . . . {Grinding}

1/363 . . . . {Drying, calcination}

1/3638 . . . . {Agglomeration, granulation, pelleting}

1/3646 . . . . {Densifying, degassing, packaging}

1/3653 . . . {Treatment with inorganic compounds}

1/3661 . . . . {Coating}

1/3669 . . . {Treatment with low-molecular organic compounds}

1/3676 . . . {Treatment with macro-molecular organic compounds}

1/3684 . . . {Treatment with organo-silicon compounds}

1/3692 . . {Combinations of treatments provided for in groups C09C 1/3615 - C09C 1/3684}

1/38 . Compounds of mercury {(C09C 1/0009, C09C 1/0015, C09C 1/0078 take precedence)}

1/40 . Compounds of aluminium {(C09C 1/0009, C09C 1/0015, C09C 1/0078, C09C 1/32 take precedence)}

1/402 . . {Satin white, modifications thereof, e.g. carbonated or silicated; Calcium sulfoaluminates; Mixtures thereof, e.g. with calcium carbonate or kaolin}

1/405 . . {containing combined silica, e.g. mica}

1/407 . . {Aluminium oxides or hydroxides}

1/42 . . Clays

1/44 . Carbon

1/46 . . Graphite {(C09C 1/0015 takes precedence)}

1/48 . . Carbon black

1/482 . . . {Preparation from used rubber products, e.g. tyres (recovery of plastics or other constituents of waste material containing plastics B29B 17/00)}

1/485 . . . {Preparation involving the use of a plasma or of an electric arc}

1/487 . . . {Separation; Recovery (quenching C09C 1/50 - C09C 1/54)}

1/50 . . . Furnace black {; Preparation thereof (separation or recovery C09C 1/487)}

1/52 . . . Channel black {; Preparation thereof (separation or recovery C09C 1/487)}

1/54 . . . Acetylene black; thermal black {; Preparation thereof (separation or recovery C09C 1/487)}

1/56 . . . Treatment of carbon black {; Purification}

1/565 . . . . {comprising an oxidative treatment with oxygen, ozone or oxygenated compounds, e.g. when such treatment occurs in a region of the furnace next to the carbon black generating reaction zone}

1/58 . . . . Agglomerating, pelleting, or the like by wet methods

1/60 . . . . Agglomerating, pelleting, or the like by dry methods

1/62 . Metallic pigments or fillers {(C09C 1/0015 takes precedence)}

1/622 . . {Comminution, shaping or abrasion of initially uncoated particles, possibly in presence of grinding aids, abrasives or chemical treating or coating agents; Particle solidification from melted or vaporised metal; Classification}

1/625 . . . {the particles consisting of zinc or a zinc alloy}

1/627 . . {Copper}

1/64 . . Aluminium

1/642 . . . {treated with inorganic compounds}

1/644 . . . {treated with organic compounds, e.g. polymers}

1/646 . . . . {concomitant with mechanical comminution, shaping or abrasion of the particles}

1/648 . . . {treated with inorganic and organic, e.g. polymeric, compounds}

1/66 . Copper alloys, e.g. bronze

3/00 Treatment in general of inorganic materials, other than fibrous fillers, to enhance their pigmenting or filling properties

3/003 . {Flushing}

3/006 . {Combinations of treatments provided for in groups C09C 3/04 - C09C 3/12}

NOTE

When classifying in this group, it is desirable to classify the individual treatment steps with symbols chosen from groups C09C 3/04 - C09C 3/12.

3/04 . Physical treatment, e.g. grinding, treatment with ultrasonic vibrations {(C09C 3/006 takes precedence)}

3/041 . . {Grinding}

3/043 . . {Drying, calcination}

3/045 . . {Agglomeration, granulation, pelleting}

3/046 . . {Densifying, degassing, packaging}

3/048 . . {Treatment with a plasma}

3/06 . Treatment with inorganic compounds {(C09C 3/006, C09C 3/048 take precedence)}

3/063 . . {Coating}

3/066 . . {Treatment or coating resulting in a free metal containing surface-region (C09C 1/0078 takes precedence)}

3/08 . Treatment with low-molecular-weight {non-polymer} organic compounds {(C09C 3/006, C09C 3/048 take precedence)}

3/10 . Treatment with macromolecular organic compounds {(C09C 3/006 takes precedence)}

3/12 . Treatment with organosilicon compounds {(C09C 3/006 takes precedence)}

2200/00 Compositional and structural details of pigments exhibiting interference colours

NOTE

When indexing codes C09C 2200/00 - C09C 2220/20 are used, no codes are given for the particle morphology according to

C09C 2200/00 (continued) the indexing codes C01P 2004/10 - C01P 2004/42 or C01P 2004/80 - C01P 2004/88

2200/10 . Interference pigments characterized by the core material
2200/1004 . . the core comprising at least one inorganic oxide, e.g. Al_2O_3, TiO_2 or SiO_2
2200/1008 . . . comprising at least one metal layer adjacent to the core material, e.g. core-M or M-core-M
2200/1012 . . . . with a protective coating on the metal layer
2200/1016 . . . comprising an intermediate layer between the core and a stack of coating layers having alternating refractive indices
2200/102 . . the core consisting of glass or silicate material like mica or clays, e.g. kaolin
2200/1025 . . . comprising at least one metal layer adjacent to core material, e.g. core-M or M-core-M
2200/1029 . . . . with a protective coating on the metallic layer
2200/1033 . . . comprising an intermediate layer between the core and a stack of coating layers having alternating refractive indices
2200/1037 . . the core consisting of an inorganic suboxide or a mixture thereof, e.g. SiOx or TiOx
2200/1041 . . . comprising at least one metal layer adjacent to core material, e.g. core-M or M-core-M
2200/1045 . . . . with a protective coating on the metallic layer
2200/105 . . . comprising an intermediate layer between the core and a stack of coating layers having alternating refractive indices
2200/1054 . . the core consisting of a metal
2200/1058 . . . comprising a protective coating on the metallic layer
2200/1062 . . the core consisting of an organic compound, e.g. Liquid Crystal Polymers [LCP], Polymers or natural pearl essence
2200/1066 . . . comprising at least one metal layer adjacent to the core material, e.g. core-M, M-core-M
2200/107 . . . . with a protective coating on the metallic layer
2200/1075 . . the core consisting of a mixture of inorganic and organic phases
2200/1079 . . . comprising at least one metal layer adjacent to the core material, e.g. core-M or M-core-M
2200/1083 . . . . with a protective coating on the metallic layer
2200/1087 . . the core consisting of bismuth oxychloride, magnesium fluoride, nitrides, carbides, borides, lead carbonate, barium or calcium sulfate, zinc sulphide, molybdenum disulphide or graphite
2200/1091 . . . comprising at least one metal layer adjacent to the core material, e.g. core-M or M-core-M
2200/1095 . . . . comprising a protective coating on the metal layer
2200/20 . Interference pigments comprising a layer with a concentration gradient or a gradient of the refractive index
2200/202 . . of sub-stoichiometric inorganic compounds
2200/205 . . of coloured inorganic materials
2200/207 . . of carbonaceous material, e.g. carbon black, graphite or SWNT
2200/24 . Interference pigments comprising a metallic reflector or absorber layer, which is not adjacent to the core
2200/30 . Interference pigments characterised by the thickness of the core or layers thereon or by the total thickness of the final pigment particle
2200/301 . . Thickness of the core
2200/302 . . Thickness of a layer with high refractive material
2200/303 . . Thickness of a layer with low refractive material
2200/304 . . Thickness of intermediate layers adjacent to the core, e.g. metallic layers, protective layers, rutilisation enhancing layers or reflective layers
2200/305 . . Thickness of intermediate layers within the stack
2200/306 . . Thickness of an absorbing layer
2200/307 . . Thickness of an outermost protective layer
2200/308 . . Total thickness of the pigment particle
2200/40 . Interference pigments comprising an outermost surface coating
2200/401 . . Inorganic protective coating
2200/402 . . Organic protective coating
2200/403 . . . Low molecular weight materials, e.g. fatty acids
2200/404 . . . . comprising additional functional groups, e.g. $-NH_2$, -C=C- or $-SO_3$
2200/405 . . . High molecular weight materials, e.g. polymers
2200/406 . . . . comprising additional functional groups, e.g. $-NH_2$, -C=C- or $-SO_3$
2200/407 . . . Organosilicon materials, e.g. silanes, silicones
2200/408 . . . . comprising additional functional groups, e.g. $–NH_2$, -C=C- or $-SO_3$
2200/409 . . Mixed inorganic-organic coating
2200/50 . Interference pigments comprising a layer or a core consisting of or comprising discrete particles, e.g. nanometric or submicrometer-sized particles
2200/502 . . Metal particles
2200/505 . . Inorganic particles, e.g. oxides, nitrides or carbides
2200/507 . . Organic particles, e.g. polymers or dyes

2210/00 Special effects or uses of interference pigments
2210/10 . Optical properties in the IR-range, e.g. camouflage pigments
2210/20 . Optical properties in the UV-range
2210/30 . A layer or the substrate forming a grating
2210/40 . Embossed layers
2210/50 . Fluorescent, luminescent or photoluminescent properties
2210/60 . Interference with laser-light, laser markable pigments

2220/00 Methods of preparing the interference pigments
2220/10 . Wet methods, e.g. co-precipitation
2220/103 . . comprising a drying or calcination step after applying each layer
2220/106 . . comprising only a drying or calcination step of the finally coated pigment
2220/20 . PVD, CVD methods or coating in a gas-phase using a fluidized bed