CPC COOPERATIVE PATENT CLASSIFICATION

C CHEMISTRY; METALLURGY

(NOTES omitted)

METALLURGY

COATING METALLIC MATERIAL; COATING MATERIAL WITH METALLIC MATERIAL; CHEMICAL SURFACE TREATMENT; DIFFUSION TREATMENT OF METALLIC MATERIAL; COATING BY VACUUM EVAPORATION, BY SPUTTERING, BY ION IMPLANTATION OR BY CHEMICAL VAPOUR DEPOSITION, IN GENERAL; INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL (NOTES omitted)

COATING METALLIC MATERIAL; COATING MATERIAL WITH METALLIC MATERIAL; SURFACE TREATMENT OF METALLIC MATERIAL BY DIFFUSION INTO THE SURFACE, BY CHEMICAL CONVERSION OR SUBSTITUTION; COATING BY VACUUM EVAPORATION, BY SPUTTERING, BY ION IMPLANTATION OR BY CHEMICAL VAPOUR DEPOSITION, IN GENERAL (making metal-coated products by extrusion B21C 23/22; covering with metal by connecting pre-existing layers to articles, see the relevant places, e.g. B21D 39/00, B23K; metallising of glass C03C; metallising mortars, concrete, artificial stone, ceramics or natural stone C04B 41/00; enamelling of, or applying a vitreous layer to, metals C23D; treating metal surfaces or coating of metals by electrolysis or electrophoresis C25D; single-crystal film growth C30B; by metallising textiles D06M 11/83; decorating textiles by locally metallising D06Q 1/04)

NOTE

In this subclass, an operation is considered as pre-treatment or after-treatment when it is specially adapted for, but quite distinct from, the coating process concerned and constitutes an independent operation. If an operation results in the formation of a permanent sub- or upper layer, it is not considered as pre-treatment or after-treatment and is classified as a multi-coating process.

WARNING

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

C23C 14/36 - C23C 14/44

covered by

C23C 14/34 - C23C 14/358

Coating by applying the coating material in the molten state

2/00 Hot-dipping or immersion processes for applying the coating material in the molten state without affecting the shape; Apparatus therefor

WARNING

Group C23C 2/00 is impacted by reclassification into groups C23C 2/325, C23C 2/50 - C23C 2/544.

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

2/003 • {Apparatus}

WARNING

Group <u>C23C 2/003</u> is impacted by reclassification into groups <u>C23C 2/0032</u> - <u>C23C 2/004</u>, <u>C23C 2/325</u>, <u>C23C 2/50</u> - <u>C23C 2/544</u>.

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

2/0032 . . {specially adapted for batch coating of substrate}

WARNING

Groups C23C 2/0032 and C23C 2/00322 are incomplete pending reclassification of documents from groups C23C 2/003, C23C 2/006 and C23C 2/02.

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

2/00322 . . . {Details of mechanisms for immersing or removing substrate from molten liquid bath, e.g. basket or lifting mechanism}

2/0034 . . {Details related to elements immersed in bath}

WARNING

Groups C23C 2/0034 - C23C 2/00348 are incomplete pending reclassification of documents from groups C23C 2/003, C23C 2/006 and C23C 2/02.

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

2/00342 . . . {Moving elements, e.g. pumps or mixers}

2/00344 {Means for moving substrates, e.g. immersed rollers or immersed bearings}

2/00348 . . . {Fixed work supports or guides}

2/0035 • {Means for continuously moving substrate through, into or out of the bath (C23C 2/00344 takes precedence)}

WARNING

Group C23C 2/0035 is incomplete pending reclassification of documents from groups C23C 2/003, C23C 2/006 and C23C 2/02.

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

2/0036 . . (Crucibles)

WARNING

Groups C23C 2/0036 - C23C 2/00362 are incomplete pending reclassification of documents from groups C23C 2/003, C23C 2/006 and C23C 2/02.

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

 2/00361 . . . {characterised by structures including means for immersing or extracting the substrate through confining wall area}

2/00362 . . . {Details related to seals, e.g. magnetic means}

2/0038 • Characterised by the pre-treatment chambers located immediately upstream of the bath or occurring locally before the dipping process

WARNING

Groups C23C 2/0038 and C23C 2/004 are incomplete pending reclassification of documents from groups C23C 2/003, C23C 2/006 and C23C 2/02.

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

2/004 . . . {Snouts}

2/006 • {Pattern or selective deposits}

WARNING

Group C23C 2/006 is impacted by reclassification into groups C23C 2/0032, C23C 2/00322, C23C 2/00344, C23C 2/00344, C23C 2/00344, C23C 2/00348, C23C 2/00355, C23C 2/0036, C23C 2/00361, C23C 2/00362, C23C 2/0038, C23C 2/004, C23C 2/0062, C23C 2/0064, C23C 2/50, C23C 2/51, C23C 2/52, C23C 2/521, C23C 2/523, C23C 2/524, C23C 2/5245, C23C 2/525, C23C 2/526, C23C 2/544, C23C 2/542 and C23C 2/544.

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

2/0062 • • {without pre-treatment of the material to be coated, e.g. using masking elements such as casings, shields, fixtures or blocking elements}

WARNING

Group C23C 2/0062 is incomplete pending reclassification of documents from group C23C 2/006.

Groups C23C 2/006 and C23C 2/0062 should be considered in order to perform a complete search.

2/0064 . . {using masking layers}

WARNING

Group C23C 2/0064 is incomplete pending reclassification of documents from group C23C 2/006.

Groups C23C 2/0064 and C23C 2/006 should be considered in order to perform a complete search.

 Pretreatment of the material to be coated, e.g. for coating on selected surface areas (C23C 2/30 takes precedence)

WARNING

Group C23C 2/02 is impacted by reclassification into groups C23C 2/022, C23C 2/0222, C23C 2/0224, C23C 2/024, C23C 2/026, C23C 2/0032 - C23C 2/004, C23C 2/325 and C23C 2/50 - C23C 2/544.

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

2/022 . . {by heating}

WARNING

Groups C23C 2/022 - C23C 2/0224 are incomplete pending reclassification of documents from group C23C 2/02.

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

2/0222 • • • {in a reactive atmosphere, e.g. oxidising or reducing atmosphere (C23C 2/024 takes precedence)}

2/0224 . . . {Two or more thermal pretreatments}

2/024 . . {by cleaning or etching}

WARNING

Group C23C 2/024 is incomplete pending reclassification of documents from group C23C 2/02.

Groups C23C 2/02 and C23C 2/024 should be considered in order to perform a complete search.

 2/026 • {Deposition of sublayers, e.g. adhesion layers or pre-applied alloying elements or corrosion protection}

WARNING

Group C23C 2/026 is incomplete pending reclassification of documents from group C23C 2/02.

Groups C23C 2/02 and C23C 2/026 should be considered in order to perform a complete search.

2/04 . characterised by the coating material

2/06 . . Zinc or cadmium or alloys based thereon

2/08 . . Tin or alloys based thereon

2/10 . Lead or alloys based thereon

2/12 . . Aluminium or alloys based thereon

 Removing excess of molten coatings; Controlling or regulating the coating thickness

WARNING

Group C23C 2/14 is impacted by reclassification into groups C23C 2/50 - C23C 2/544.

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

2/16 . . using fluids under pressure, e.g. air knives

2/18 . . . Removing excess of molten coatings from elongated material

2/185 {Tubes; Wires}

2/20 . . . Strips; Plates

2/22 • by rubbing, e.g. using knives {, e.g. rubbing solids}

2/24 . . using magnetic or electric fields

2/26 • After-treatment (C23C 2/14 takes precedence)

WARNING

Group C23C 2/26 is impacted by reclassification into groups C23C 2/261, C23C 2/325 and C23C 2/50 - C23C 2/544.

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

2/261 • { in a gas atmosphere, e.g. inert or reducing atmosphere}

WARNING

Group C23C 2/261 is incomplete pending reclassification of documents from groups C23C 2/26, C23C 2/265, C23C 2/28 and C23C 2/285.

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

2/265 • • {by applying solid particles to the molten coating}

WARNING

Group <u>C23C 2/265</u> is impacted by reclassification into group <u>C23C 2/261</u>.

Groups C23C 2/265 and C23C 2/261 should be considered in order to perform a complete search.

2/28 . Thermal after-treatment, e.g. treatment in oil bath

WARNING

Group C23C 2/28 is impacted by reclassification into groups C23C 2/261 and C23C 2/29.

Groups C23C 2/28, C23C 2/261 and C23C 2/29 should be considered in order to perform a complete search.

2/285 . . . {for remelting the coating}

WARNING

Group <u>C23C 2/285</u> is impacted by reclassification into group <u>C23C 2/261</u>.

Groups C23C 2/285 and C23C 2/261 should be considered in order to perform a complete search.

2/29	• • {Cooling or quenching}	4/02	• Pretreatment of the material to be coated, e.g. for
	WARNING		coating on selected surface areas
		4/04	characterised by the coating material
	Group C23C 2/29 is incomplete pending	4/06	Metallic material
	reclassification of documents from group	4/067	containing free particles of non-metal elements,
	<u>C23C 2/28</u> .		e.g. carbon, silicon, boron, phosphorus or
	Groups <u>C23C 2/28</u> and <u>C23C 2/29</u> should		arsenic
	be considered in order to perform a	4/073	containing MCrAl or MCrAlY alloys, where M
	complete search.		is nickel, cobalt or iron, with or without non-
2/30	• Fluxes or coverings on molten baths (C23C 2/22		metal elements
	takes precedence)	4/08	• • containing only metal elements (<u>C23C 4/073</u>
2/32	 using vibratory energy applied to the bath or 	4/10	takes precedence)
	substrate (C23C 2/14 takes precedence)	4/10	• Oxides, borides, carbides, nitrides or silicides;
2/325	• {Processes or devices for cleaning the bath}	4/11	Mixtures thereof Oxides
	WARNING	4/11	
		4/12	• characterised by the method of spraying
	Group C23C 2/325 is incomplete pending	4/123	Spraying molten metal
	reclassification of documents from groups	4/126	. Detonation spraying
	C23C 2/00, C23C 2/003, C23C 2/02 and C23C 2/26.	4/129	. Flame spraying
		4/131	Wire arc spraying
	All groups listed in this Warning should be considered in order to perform a complete	4/134	. Plasma spraying
	search.	4/137	Spraying in vacuum or in an inert atmosphere
	search.	4/14	• • for coating elongate material
2/34	 characterised by the shape of the material to be 	4/16 4/18	Wires; Tubes . After-treatment
	treated (C23C 2/14 takes precedence)	4/18 4/185	
2/36	Elongated material	4/183	• • {Separation of the coating from the substrate}
2/38	Wires; Tubes	6/00	Coating by casting molten material on the
2/385	• • • • {Tubes of specific length}		substrate
2/40	Plates; Strips	a 	
2/405	• • • • {Plates of specific length}	Solid state d	liffusion into metallic material surfaces
2/50	 {Controlling or regulating the coating processes 	8/00	Solid state diffusion of only non-metal elements
			Solid state diffusion of only non-inetal elements
	$(\underline{\text{C23C 2/14}} \text{ takes precedence})$	2,00	into metallic material surfaces (diffusion of silicon
	(C23C 2/14 takes precedence)} WARNING		into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of
	WARNING		into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a
	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete		into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface
	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from		into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings,
	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete		into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence)
	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006,	8/02	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence). Pretreatment of the material to be coated
	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26.	8/02	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence)
	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be		into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using
2/51	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search.	8/02 8/04	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks
2/51	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • Computer-controlled implementation}	8/02 8/04 8/06	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence)
2/52	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing}	8/02 8/04 8/06 8/08	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied
2/52 2/521	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath}	8/02 8/04 8/06 8/08 8/10	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied Oxidising
2/52 2/521 2/522	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath}	8/02 8/04 8/06 8/08	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied only one dement being applied only one demental oxygen or ozone
2/52 2/521 2/522 2/523	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount}	8/02 8/04 8/06 8/08 8/10 8/12	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied only one element being applied only one dement being applied only one coated takes precedence)
2/52 2/521 2/522 2/523 2/524	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. Computer-controlled implementation With means for measuring or sensing Composition of the bath Temperature of the bath Bath level or amount Position of the substrate	8/02 8/04 8/06 8/08 8/10 8/12 8/14	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied only one dement being applied only one demental oxygen or ozone
2/52 2/521 2/522 2/523 2/524 2/5245	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. Computer-controlled implementation With means for measuring or sensing Composition of the bath Remperature of the bath Bath level or amount Position of the substrate for reducing vibrations of the substrate	8/02 8/04 8/06 8/08 8/10 8/12 8/14	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied only one element being applied only one elemental oxygen or ozone one oxidising using elemental oxygen or ozone using oxygen-containing compounds, e.g.
2/52 2/521 2/522 2/523 2/524 2/5245 2/525	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {Speed of the substrate}	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied only one element being applied only one elemental oxygen or ozone one oxidising using elemental oxygen or ozone using oxygen-containing compounds, e.g. water, carbon dioxide
2/52 2/521 2/522 2/523 2/524 2/5245	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {Speed of the substrate} • • • {for visually inspecting the surface quality of	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ouriging oxygen or ozone using elemental oxygen or ozone using oxygen-containing compounds, e.g. water, carbon dioxide Oxidising of ferrous surfaces
2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate}	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ouriging using elemental oxygen or ozone ouriging oxygen-containing compounds, e.g. water, carbon dioxide ouriging Carburising
2/52 2/521 2/522 2/523 2/524 2/5245 2/525	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • {of the mixing or stirring the bath}	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ouriging using elemental oxygen or ozone ouriging oxygen-containing compounds, e.g. water, carbon dioxide ouriging Carburising ouriging ouriginates
2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • {of the mixing or stirring the bath} • • {using static devices separate from the	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied only one element being applied only one elemental oxygen or ozone one oxidising one oxidising of ferrous surfaces using oxygen-containing compounds, e.g. water, carbon dioxide one oxidising of ferrous surfaces Carburising of ferrous surfaces Nitriding
2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • {of the mixing or stirring the bath}	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26 8/28 8/30	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied oursing converses oursing elemental oxygen or ozone oursing oxygen-containing compounds, e.g. water, carbon dioxide oursing compounds, e.g. water, carbon dioxide carbonising oursing of ferrous surfaces oursing of ferrous surfaces oursing of ferrous surfaces oursing of ferrous surfaces
2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526 2/54 2/542	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Position of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • {of the mixing or stirring the bath} • • {using static devices separate from the substrate, e.g. a fixed plate}	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26 8/28	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ouriging of ferrous surfaces using elemental oxygen or ozone ouriging oxygen-containing compounds, e.g. water, carbon dioxide ouriging carbon dioxide ouriging ourigi
2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526 2/54 2/542	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Fosition of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • {of the mixing or stirring the bath} • • {using static devices separate from the substrate, e.g. a fixed plate} • • {using moving mixing devices separate from the substrate, e.g. an impeller of blade}	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26 8/28 8/30	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ouriging using elemental oxygen or ozone ouriging oxygen-containing compounds, e.g. water, carbon dioxide ouriging carbon dioxide ouriging ourigi
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2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526 2/54 2/542	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {for reducing vibrations of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • { using static devices separate from the substrate, e.g. a fixed plate} • • { using moving mixing devices separate from the substrate, e.g. an impeller of blade} Coating by spraying the coating material in the molten state, e.g. by flame, plasma or electric	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26 8/28 8/30 8/32 8/34	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ourside of terrous surfaces oursing oxygen-containing compounds, e.g. water, carbon dioxide current of ferrous surfaces current of ferrous surfaces oursing of ferrous surfaces current of ferrous surface
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2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526 2/54 2/542	Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • • {for the mixing or stirring the bath} • • {using static devices separate from the substrate, e.g. a fixed plate} • • • {using moving mixing devices separate from the substrate, e.g. an impeller of blade} Coating by spraying the coating material in the molten state, e.g. by flame, plasma or electric discharge (build-up welding B23K, e.g. B23K 5/18, B23K 9/04)	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26 8/28 8/30 8/32 8/34 8/36 8/38 8/40	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ourside of surfaces oursing elemental oxygen or ozone oursing oxygen-containing compounds, e.g. water, carbon dioxide oursing oxygen-containing compounds, e.g. water, carbon dioxide oursing of ferrous surfaces oursing of ferrous surfaces oursing of ferrous surfaces carbonitriding ourside of ferrous surfaces carbonitriding ourside of ferrous surfaces more than one element being applied in one step Carbonitriding ourside of ferrous surfaces more than one element being applied in more than one step using ionised gases, e.g. ionitriding Treatment of ferrous surfaces using liquids, e.g. salt baths, liquid suspensions
2/52 2/521 2/522 2/523 2/524 2/5245 2/525 2/526 2/54 2/542 2/544 4/00	WARNING Groups C23C 2/50 - C23C 2/544 are incomplete pending reclassification of documents from groups C23C 2/00, C23C 2/003, C23C 2/006, C23C 2/02, C23C 2/14 and C23C 2/26. All groups listed in this Warning should be considered in order to perform a complete search. • {Computer-controlled implementation} • {with means for measuring or sensing} • • {Composition of the bath} • • {Temperature of the bath} • • {Bath level or amount} • • {Fosition of the substrate} • • • {for reducing vibrations of the substrate} • • • {for visually inspecting the surface quality of the substrate} • • • {speed of the mixing or stirring the bath} • • {using static devices separate from the substrate, e.g. a fixed plate} • • • {using moving mixing devices separate from the substrate, e.g. an impeller of blade} Coating by spraying the coating material in the molten state, e.g. by flame, plasma or electric discharge (build-up welding B23K, e.g. B23K 5/18,	8/02 8/04 8/06 8/08 8/10 8/12 8/14 8/16 8/18 8/20 8/22 8/24 8/26 8/28 8/30 8/32 8/34 8/36 8/38	into metallic material surfaces (diffusion of silicon C23C 10/00); Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (C23C 14/00 takes precedence) Pretreatment of the material to be coated (C23C 8/04 takes precedence) Treatment of selected surface areas, e.g. using masks using gases (C23C 8/36 takes precedence) only one element being applied ourside of surfaces using elemental oxygen or ozone ourside or oxidising ourside or oxidising of ferrous surfaces oursing oxygen-containing compounds, e.g. water, carbon dioxide ourside or oxidising of ferrous surfaces ourside or oxidising of ferrous surfaces ourside or oxidising of ferrous surfaces carburising ourside or of ferrous surfaces carbonitriding ourside or oxidising applied in one step carbonitriding ourside or oxidising applied in more than one step using ionised gases, e.g. ionitriding urside or oxidising of ferrous surfaces using ionised gases, e.g. ionitriding Treatment of ferrous surfaces

8/44	Carburising	10/60	After-treatment
8/46	Carburising of ferrous surfaces	10/00	· Arter-treatment
8/48	Nitriding	12/00	Solid state diffusion of at least one non-metal
8/50	of ferrous surfaces		element other than silicon and at least one metal
8/52	more than one element being applied in one step	12/02	element or silicon into metallic material surfaces
8/54	Carbo-nitriding	12/02	Diffusion in one step
8/56	of ferrous surfaces	Coating by v	acuum evaporation, by sputtering or by ion
8/58	more than one element being applied in more than	implantation	
	one step	14/00	
8/60	 using solids, e.g. powders, pastes (using liquid 	14/00	Coating by vacuum evaporation, by sputtering or by ion implantation of the coating forming
	suspensions of solids <u>C23C 8/40</u>)		material
8/62	only one element being applied	14/0005	• {Separation of the coating from the substrate}
8/64	Carburising	14/001	• {Coating on a liquid substrate}
8/66	of ferrous surfaces	14/0015	• {characterized by the colour of the layer}
8/68	Boronising	14/0021	• {Reactive sputtering or evaporation}
8/70	of ferrous surfaces	14/0026	• • {Activation or excitation of reactive gases outside
8/72	• more than one element being applied in one step		the coating chamber}
8/74	Carbo-nitriding of ferrous surfaces	14/0031	• • • {Bombardment of substrates by reactive ion
8/76 8/78	of ferrous surfaces . more than one element being applied in more than		beams}
0/ / 0	one step	14/0036	• • {Reactive sputtering}
8/80	After-treatment	14/0042	• • • {Controlling partial pressure or flow rate
			of reactive or inert gases with feedback of
10/00	Solid state diffusion of only metal elements or	14/0047	measurements}
10/00	silicon into metallic material surfaces	14/0047	 . • {Activation or excitation of reactive gases outside the coating chamber}
10/02	Pretreatment of the material to be coated	14/0052	• • • {Bombardment of substrates by reactive ion
10/04	(C23C 10/04 takes precedence)	14/0032	beams}
10/04	Diffusion into selected surface areas, e.g. using masks	14/0057	• • • {using reactive gases other than O ₂ , H ₂ O, N ₂ ,
10/06	 using gases 	- 1, 0 0 0 1	NH ₃ or CH ₄ }
10/08	using gasesonly one element being diffused	14/0063	{characterised by means for introducing or
10/10	Chromising		removing gases}
10/12	of ferrous surfaces	14/0068	• • • {characterised by means for confinement
10/14	more than one element being diffused in one step		of gases or sputtered material, e.g. screens,
10/16	more than one element being diffused in more		baffles}
	than one step	14/0073	• • • {by exposing the substrates to reactive gases
10/18	 using liquids, e.g. salt baths, liquid suspensions 	14/0078	intermittently}
10/20	only one element being diffused	14/0076	• • • • {by moving the substrates between spatially separate sputtering and reaction stations}
10/22	Metal melt containing the element to be	14/0084	• • {Producing gradient compositions}
	diffused	14/0089	{in metallic mode}
10/24	Salt bath containing the element to be diffused	14/0094	• • · {in transition mode}
10/26	more than one element being diffused	14/02	• Pretreatment of the material to be coated
10/28	using solids, e.g. powders, pastes		(C23C 14/04 takes precedence)
10/30	. using a layer of powder or paste on the surface	14/021	• • {Cleaning or etching treatments}
10/32	(using liquid suspensions of solids <u>C23C 10/18</u>) Chromising	14/022	• • • {by means of bombardment with energetic
10/32	Embedding in a powder mixture, i.e. pack		particles or radiation}
10/54	cementation	14/024	• • {Deposition of sublayers, e.g. to promote
10/36	only one element being diffused		adhesion of the coating (<u>C23C 14/027</u> takes
10/38	Chromising	14/025	precedence)}
10/40	of ferrous surfaces	14/025 14/027	{Metallic sublayers}
10/42	in the presence of volatile transport	14/027	. {Graded interfaces}. {Physical treatment to alter the texture of the
	additives, e.g. halogenated substances	14/028	substrate surface, e.g. grinding, polishing}
10/44	Siliconising	14/04	• Coating on selected surface areas, e.g. using masks
10/46	of ferrous surfaces	14/042	• {using masks}
10/48	Aluminising	14/044	• • • {using masks to redistribute rather than totally
10/50	of ferrous surfaces	-	prevent coating, e.g. producing thickness
10/52	more than one element being diffused in one		gradient}
10/54	step	14/046	• • {Coating cavities or hollow spaces, e.g. interior of
10/54	Diffusion of at least chromium		tubes; Infiltration of porous substrates}
10/56	and at least aluminium	14/048	• • {using irradiation by energy or particles}
10/58	more than one element being diffused in more	14/06	characterised by the coating material
	than one step		$(\{C23C\ 14/0021\}\ , C23C\ 14/04\ take\ precedence)$

14/0605	{Carbon}	14/3407 {Cathode assembly for sputtering apparatus,
14/0611 14/0617	 {Diamond} {AIII BV compounds, where A is Al, Ga, In or Tl	e.g. Target} 14/3414 {Metallurgical or chemical aspects of target
4.4/0.400	and B is N, P, As, Sb or Bi}	preparation, e.g. casting, powder metallurgy}
14/0623	{Sulfides, selenides or tellurides}	14/3421 {using heated targets}
14/0629	• • • {of zinc, cadmium or mercury}	14/3428 {using liquid targets}
14/0635	{Carbides}	14/3435 {Applying energy to the substrate during
14/0641	• • {Nitrides (<u>C23C 14/0617</u> takes precedence)}	sputtering}
14/0647	{Boron nitride}	14/3442 {using an ion beam} 14/345 {using substrate bias}
14/0652	{Silicon nitride}	14/345 {using substrate bias} 14/3457 {using other particles than noble gas ions
14/0658	{Carbon nitride}	(<u>C23C 14/0036, C23C 14/46</u> take precedence)
14/0664	• • {Carbonitrides}	14/3464 {using more than one target (<u>C23C 14/56</u> takes
14/067	• • {Borides}	precedence)}
14/0676	• • {Oxynitrides}	14/3471 • • • {Introduction of auxiliary energy into the
14/0682	• • {Silicides}	plasma}
14/0688	 {Cermets, e.g. mixtures of metal and one or more of carbides, nitrides, oxides or borides} 	14/3478 {using electrons, e.g. triode sputtering}
14/0604		14/3485 {using pulsed power to the target}
14/0694 14/08	{Halides}	14/3492 {Variation of parameters during sputtering}
14/08	 Oxides (<u>C23C 14/10</u> takes precedence) {of aluminium, magnesium or beryllium} 	14/35 by application of a magnetic field, e.g.
	{ of aluminium, magnesium or berymum} { of alkaline earth metals }	magnetron sputtering {(C23C 14/3457 takes
14/082 14/083	{of arkanne earth metals} {of refractory metals or yttrium}	precedence)}
14/085	{of refractory metals of ythrum} {of iron group metals}	14/351 {using a magnetic field in close vicinity to
14/085	• • {of zinc, germanium, cadmium, indium, tin,	the substrate}
14/000	thallium or bismuth}	14/352 {using more than one target ($\underline{\text{C23C } 14/56}$
14/087	• • { of copper or solid solutions thereof }	takes precedence)}
14/088	• • {of the type ABO ₃ with A representing alkali,	14/354 {Introduction of auxiliary energy into the
14/000	alkaline earth metal or Pb and B representing a	plasma}
	refractory or rare earth metal}	14/355 {using electrons, e.g. triode sputtering}
14/10	Glass or silica	14/357 {Microwaves, e.g. electron cyclotron
14/12	Organic material	resonance enhanced sputtering}
14/14	Metallic material, boron or silicon	14/358 {Inductive energy}
14/16	on metallic substrates or on substrates of boron	14/46 by ion beam produced by an external ion source
1.4/1.65	or silicon	14/48 Ion implantation
14/165	• • • {by cathodic sputtering}	14/50 • • Substrate holders
14/18	• • • on other inorganic substrates	14/505 {for rotation of the substrates}
14/185	• • • {by cathodic sputtering}	14/52 Means for observation of the coating process
14/20	on organic substrates	14/54 Controlling or regulating the coating process
14/205	• • • {by cathodic sputtering}	14/541 • • • {Heating or cooling of the substrates}
14/22 14/221	 characterised by the process of coating {Ion beam deposition (C23C 14/46, C23C 14/48 	14/542 {Controlling the film thickness or evaporation
14/221	take precedence)}	rate}
14/223	. {specially adapted for coating particles}	14/543 {using measurement on the vapor source}
14/225	Specially adapted for coating particles? Oblique incidence of vaporised material on	14/544 {using measurement in the gas phase}
17/443	substrate }	14/545 {using measurement on deposited material}
14/226	• • { in order to form films with columnar	14/546 {using crystal oscillators}
14/220	structure}	14/547 {using optical methods}
14/228	• • {Gas flow assisted PVD deposition}	14/548 {Controlling the composition}
14/24	Vacuum evaporation	14/56 Apparatus specially adapted for continuous
14/243	• • • {Crucibles for source material (C23C 14/28,	coating; Arrangements for maintaining the
	C23C 14/30 take precedence)}	vacuum, e.g. vacuum locks
14/246	{Replenishment of source material}	14/562 {for coating elongated substrates}
14/26	by resistance or inductive heating of the source	14/564 {Means for minimising impurities in the coating chamber such as dust, moisture,
14/28	• • • by wave energy or particle radiation	residual gases}
	(<u>C23C 14/32</u> - <u>C23C 14/48</u> take precedence)	14/566 {using a load-lock chamber}
14/30	by electron bombardment	14/568 {Transferring the substrates through a series
14/32	• • • by explosion; by evaporation and subsequent	of coating stations (C23C 14/562 takes
	ionisation of the vapours {, e.g. ion-	precedence)}
	plating}(<u>C23C 14/34</u> - <u>C23C 14/48</u> take	14/58 • After-treatment
14/225	precedence)	14/5806 {Thermal treatment}
14/325	• • • {Electric arc evaporation}	14/5813 {using lasers}
14/34	Sputtering	14/582 {using electron bombardment}

14/5826	• • {Treatment with charged particles (C23C 14/582	16/276	• • • {using plasma jets}
1,,0020	takes precedence)}	16/277	• • • {using other elements in the gas phase
14/5833	{Ion beam bombardment}		besides carbon and hydrogen; using other
14/584	• • {Non-reactive treatment}		elements besides carbon, hydrogen and
14/5846	{Reactive treatment}		oxygen in case of use of combustion torches;
14/5853	{Oxidation}		using other elements besides carbon,
14/586	{Nitriding}		hydrogen and inert gas in case of use of
14/5866	{Treatment with sulfur, selenium or tellurium}		plasma jets}
14/5873	{Removal of material}	16/278	{doping or introduction of a secondary phase
14/588	{by mechanical treatment}	1 < 12.50	in the diamond}
14/5886	{Mechanical treatment (involving removal of	16/279	{control of diamond crystallography}
	material <u>C23C 14/588</u>)}	16/28	. Deposition of only one other non-metal element
14/5893	• • {Mixing of deposited material}	16/30	 Deposition of compounds, mixtures or solid solutions, e.g. borides, carbides, nitrides
Chemical dep	position or plating by decomposition; Contact plating	16/301	• • • {AIII BV compounds, where A is Al, Ga, In or
16/00	Chemical coating by decomposition of gaseous	16/202	Tl and B is N, P, As, Sb or Bi
10/00	compounds, without leaving reaction products	16/303 16/305	 {Nitrides} {Sulfides, selenides, or tellurides}
	of surface material in the coating, i.e. chemical	16/306	• • • {Surrides, selenides, of tenundes} • • • • {AII BVI compounds, where A is Zn, Cd or
	vapour deposition [CVD] processes (reactive	10/300	Hg and B is S, Se or Te
	sputtering or vacuum evaporation C23C 14/00)	16/308	• • • {Oxynitrides}
16/003	• {Coating on a liquid substrate}	16/32	Carbides
16/006	• {characterized by the colour of the layer}	16/325	{Silicon carbide}
16/01	 on temporary substrates, e.g. substrates 	16/34	Nitrides {(C23C 16/303 takes precedence)}
	subsequently removed by etching	16/342	{Boron nitride}
16/02	 Pretreatment of the material to be coated 	16/345	{Silicon nitride}
	(<u>C23C 16/04</u> takes precedence)	16/347	{Carbon nitride}
16/0209	• • {by heating}	16/36	Carbonitrides
16/0218	• • • {in a reactive atmosphere (C23C 16/0227 takes	16/38	Borides
4 4 10 2 2 2	precedence)}	16/40	Oxides
16/0227	• • {by cleaning or etching}	16/401	{containing silicon}
16/0236	• • {by etching with a reactive gas}	16/402	{Silicon dioxide}
16/0245	{by etching with a plasma}	16/403	• • • {of aluminium, magnesium or beryllium}
16/0254	• (Physical treatment to alter the texture of the	16/404	• • • {of alkaline earth metals}
16/0263	surface, e.g. scratching or polishing} {Irradiation with laser or particle beam}	16/405	• • • {of refractory metals or yttrium}
16/0203	{ Irradiation with laser of particle beam} {Deposition of sub-layers, e.g. to promote the}	16/406	• • • {of iron group metals}
10/02/2	adhesion of the main coating}	16/407	• • • { of zinc, germanium, cadmium, indium, tin,
16/0281	• • • {of metallic sub-layers (C23C 16/029 takes		thallium or bismuth}
10/0201	precedence)}	16/408	• • • {of copper or solid solutions thereof}
16/029	• • {Graded interfaces}	16/409	• • • {of the type ABO ₃ with A representing
16/04	• Coating on selected surface areas, e.g. using masks		alkali, alkaline earth metal or lead and B
16/042	• • {using masks}		representing a refractory metal, nickel,
16/045	• • {Coating cavities or hollow spaces, e.g. interior of		scandium or a lanthanide}
	tubes; Infiltration of porous substrates}	16/42	Silicides
16/047	• • {using irradiation by energy or particles}	16/44	• characterised by the method of coating (C23C 16/04
16/06	 characterised by the deposition of metallic material 	16/4401	takes precedence) • {Means for minimising impurities, e.g. dust,
16/08	from metal halides	10/4401	moisture or residual gas, in the reaction chamber
16/10	Deposition of chromium only	16/4402	• • {Reduction of impurities in the source gas}
16/12	Deposition of aluminium only	16/4404	• • {Coatings or surface treatment on the inside of
16/14	Deposition of only one other metal element	10/ 1101	the reaction chamber or on parts thereof}
16/16	from metal carbonyl compounds	16/4405	• • • {Cleaning of reactor or parts inside the reactor
16/18	from metallo-organic compounds		by using reactive gases}
16/20	Deposition of aluminium only	16/4407	{Cleaning of reactor or reactor parts by using
16/22	 characterised by the deposition of inorganic material, other than metallic material 	16/4408	wet or mechanical methods} {by purging residual gases from the reaction
16/24	Deposition of silicon only		chamber or gas lines}
16/26	Deposition of carbon only	16/4409	• • {characterised by sealing means}
16/27	Diamond only	16/4411	• • {Cooling of the reaction chamber walls
16/271	• • • {using hot filaments}		(<u>C23C 16/45572</u> takes precedence)}
16/272	• • • {using DC, AC or RF discharges}	16/4412	• • {Details relating to the exhausts, e.g. pumps,
16/274	• • • {using microwave discharges}		filters, scrubbers, particle traps}
16/275	• • • {using combustion torches}	16/4414	• • {Electrochemical vapour deposition [EVD]}

16/4415 • • {Acoustic wave CVD}	16/45536 {Use of plasma, radiation or
16/4417 • • {Methods specially adapted for coating powder}	electromagnetic fields}
16/4418 • • • {Methods for making free-standing articles	16/45538 {Plasma being used continuously
(C23C 16/01 takes precedence)	during the ALD cycle}
16/442 using fluidised bed process	16/4554 {Plasma being used non-continuously
16/448 characterised by the method used for generating	in between ALD reactions
reactive gas streams, e.g. by evaporation or	(<u>C23C 16/56</u> takes precedence)
sublimation of precursor materials	16/45542 {Plasma being used non-continuously
16/4481 • • • {by evaporation using carrier gas in contact	during the ALD reactions}
with the source material (C23C 16/4486 takes	16/45544 {characterized by the apparatus}
precedence)}	16/45546 {specially adapted for a substrate stack
16/4482 {by bubbling of carrier gas through liquid	in the ALD reactor}
source material}	16/45548 {having arrangements for gas injection
16/4483 {using a porous body}	at different locations of the reactor for
16/4485 • • • {by evaporation without using carrier	each ALD half-reaction}
gas in contact with the source material	16/45551 {for relative movement of the
(C23C 16/4486 takes precedence)	substrate and the gas injectors or half-
16/4486 {by producing an aerosol and subsequent	reaction reactor compartments}
evaporation of the droplets or particles}	16/45553 {characterized by the use of precursors
16/4487 {by using a condenser}	specially adapted for ALD}
16/4488 {by <u>in situ</u> generation of reactive gas by	16/45555 {applied in non-semiconductor
chemical or electrochemical reaction}	technology}
16/452 by activating reactive gas streams before	16/45557 {Pulsed pressure or control pressure}
{their} introduction into the reaction chamber,	16/45559 {Diffusion of reactive gas to substrate}
e.g. by {ionisation} or addition of reactive	16/45561 {Gas plumbing upstream of the reaction
species	chamber}
16/453 passing the reaction gases through burners	16/45563 {Gas nozzles}
or torches, e.g. atmospheric pressure CVD	16/45565 {Shower nozzles}
(C23C 16/513 takes precedence; for flame or	16/45568 • • • • {Porous nozzles}
plasma spraying of coating material in the molten	16/4557 {Heated nozzles}
state <u>C23C 4/00</u>)	16/45572 {Cooled nozzles}
16/455 characterised by the method used for introducing	16/45574 {Nozzles for more than one gas}
gases into reaction chamber or for modifying gas	16/45576 {Coaxial inlets for each gas}
flows in reaction chamber	16/45578 {Elongated nozzles, tubes with holes}
16/45502 {Flow conditions in reaction chamber}	
16/45504 {Laminar flow}	16/4558 {Perforated rings}
16/45506 {Turbulent flow}	16/45582 {Expansion of gas before it reaches the
16/45508 {Radial flow}	substrate}
16/4551 { Jet streams }	16/45585 {Compression of gas before it reaches the
16/45512 {Premixing before introduction in the reaction	substrate}
chamber}	16/45587 {Mechanical means for changing the gas flow}
16/45514 {Mixing in close vicinity to the substrate}	16/45589 {Movable means, e.g. fans}
16/45517 • • • {Confinement of gases to vicinity of substrate}	16/45591 {Fixed means, e.g. wings, baffles}
16/45519 {Inert gas curtains}	16/45593 {Recirculation of reactive gases}
16/45521 • • • {the gas, other than thermal contact gas,	16/45595 {Atmospheric CVD gas inlets with no enclosed
being introduced the rear of the substrate to	reaction chamber}
flow around its periphery}	16/45597 {Reactive back side gas}
16/45523 • • • {Pulsed gas flow or change of composition	16/458 characterised by the method used for supporting
over time}	substrates in the reaction chamber
16/45525 {Atomic layer deposition [ALD]}	16/4581 {characterised by material of construction or
16/45527 {characterized by the ALD cycle, e.g.	surface finish of the means for supporting the
different flows or temperatures during	substrate}
half-reactions, unusual pulsing sequence,	16/4582 {Rigid and flat substrates, e.g. plates or discs
use of precursor mixtures or auxiliary	$(\underline{\text{C23C } 16/4581} \text{ takes precedence})$
reactants or activations}	16/4583 {the substrate being supported substantially
16/45529 { specially adapted for making a	horizontally}
layer stack of alternating different	16/4584 {the substrate being rotated}
compositions or gradient compositions}	16/4585 {Devices at or outside the perimeter of
16/45531 { specially adapted for making ternary or	the substrate support, e.g. clamping rings,
higher compositions}	shrouds}
16/45534 {Use of auxiliary reactants other	16/4586 {Elements in the interior of the support,
than used for contributing to the	e.g. electrodes, heating or cooling devices}
composition of the main film, e.g.	16/4587 {the substrate being supported substantially
catalysts, activators or scavengers}	vertically}
,,,	

16/4588	• • • • {the substrate being rotated}	18/1212 {Zeolites, glasses}
16/46	characterised by the method used for heating	18/1216 {Metal oxides (<u>C23C 18/1212</u> takes
	the substrate (<u>C23C 16/48</u> , <u>C23C 16/50</u> take	precedence)}
	precedence)	18/122 {Inorganic polymers, e.g. silanes,
16/463	• • • {Cooling of the substrate}	polysilazanes, polysiloxanes}
16/466	• • • {using thermal contact gas}	18/1225 {Deposition of multilayers of inorganic
16/48	• • by irradiation, e.g. photolysis, radiolysis, particle	material}
	radiation	18/1229 • • • {Composition of the substrate}
16/481	• • {by radiant heating of the substrate}	18/1233 · · · · {Organic substrates}
16/482	• • { using incoherent light, UV to IR, e.g. lamps}	18/1237 {Composite substrates, e.g. laminated,
16/483	• • { using coherent light, UV to IR, e.g. lasers}	premixed}
16/484	• • • {using X-ray radiation}	18/1241 {Metallic substrates}
16/485	• • • {using synchrotron radiation}	18/1245 • • • • {Inorganic substrates other than metallic}
16/486	• • • {using ion beam radiation}	18/125 • • • {Process of deposition of the inorganic
16/487	• • • {using electron radiation}	material }
16/488	{Protection of windows for introduction of	18/1254 {Sol or sol-gel processing}
	radiation into the coating chamber}	18/1258 • • • • { Spray pyrolysis }
16/50	• using electric discharges {(generation and control	18/1262 • • • • { involving particles, e.g. carbon nanotubes
	of plasma in discharge tubes for surface treatment	[CNT], flakes}
	<u>H01J 37/32, H01J 37/34</u>)}	18/1266 • • • • • {Particles formed <u>in situ</u> }
16/503	• • using dc or ac discharges	18/127 • • • • • {Preformed particles}
16/505	• • • using radio frequency discharges	18/1275 • • • • {performed under inert atmosphere}
16/507	• • • using external electrodes, e.g. in tunnel type	18/1279 • • • • {performed under reactive atmosphere, e.g.
	reactors	oxidising or reducing atmospheres}
16/509	• • • using internal electrodes	18/1283 {Control of temperature, e.g. gradual
16/5093	• • • • {Coaxial electrodes}	temperature increase, modulation of
16/5096	• • • • {Flat-bed apparatus}	temperature}
16/511	using microwave discharges	18/1287 { with flow inducing means, e.g. ultrasonic}
16/513	• • using plasma jets	18/1291 {by heating of the substrate}
16/515	using pulsed discharges	18/1295 { with after-treatment of the deposited
16/517	• • using a combination of discharges	inorganic material}
	covered by two or more of groups	18/14 . Decomposition by irradiation, e.g. photolysis,
	<u>C23C 16/503</u> - <u>C23C 16/515</u>	particle radiation {or by mixed irradiation sources}
16/52	Controlling or regulating the coating process	18/143 • • {Radiation by light, e.g. photolysis or pyrolysis}
	{(<u>C23C 16/45557</u> , <u>C23C 16/279</u> take	18/145 • • {Radiation by charged particles, e.g. electron beams or ion irradiation}
16/54	precedence)}	
16/54	Apparatus specially adapted for continuous	18/16 • by reduction or substitution, e.g. electroless plating (C23C 18/54 takes precedence)
16/545	coating {for coating elongated substrates}	18/1601 • • {Process or apparatus}
16/56	After-treatment	18/1603 {coating on selected surface areas}
10/30	· Arter-treatment	18/1605 {by masking}
18/00	Chemical coating by decomposition of either liquid	18/1607 {by direct patterning}
	compounds or solutions of the coating forming	18/1608 {from pretreatment step, i.e. selective pre-
	compounds, without leaving reaction products of	treatment}
	surface material in the coating; Contact plating	18/161 {from plating step, e.g. inkjet}
	NOTE	18/1612 {through irradiation means}
	This groups covers also suspensions containing	18/1614 {plating on one side}
	reactive liquids and non-reactive solid particles.	18/1616 {interior or inner surface}
	reactive riquids and non-reactive solid particles.	18/1617 {Purification and regeneration of coating
18/02	 by thermal decomposition 	baths}
18/04	. Pretreatment of the material to be coated	18/1619 {Apparatus for electroless plating}
	(C23C 18/06 takes precedence)	18/1621 {Protection of inner surfaces of the
18/06	 Coating on selected surface areas, e.g. using 	apparatus}
	masks	18/1623 {through electrochemical processes}
18/08	 characterised by the deposition of metallic 	18/1625 {through chemical processes}
	material	18/1626 {through enemical processes}
18/10	Deposition of aluminium only	18/1628 {Specific elements or parts of the apparatus}
18/12	characterised by the deposition of inorganic	18/163 {Supporting devices for articles to be
	material other than metallic material	coated}
18/1204	• • • {inorganic material, e.g. non-oxide and non-	18/1632 {Features specific for the apparatus, e.g.
	metallic such as sulfides, nitrides based	layout of cells and of its equipment, multiple
10/1200	compounds}	cells}
18/1208	· · · · {Oxides, e.g. ceramics}	18/1633 {Process of electroless plating}

18/1635 Composition of the substrate 18/1813 (by radiant energy)			
18/1639 Substrates other hum metallic, e.g. inorganic or or organic or non-conductive 18/1641 Organic substrates, e.g. resin, plastic 18/1827 (and yone step pretrumment) 18/1642 (semiconductor (semiconductor) (18/1831 (18/		• • • {Composition of the substrate}	
18/1641 O Organic or non-conductive 18/1824 (by chemical pretreatment 18/187 Oully une sheep pretruttment Oully under the cheep sheep of the			
18/1641 O'granic substrates, e.g. resin, plassic 18/1827 July une step pretreatment]	18/1639		
18/1642 Semiconductor (semiconductor H011_27288) 18/1644 Iporous substrates 18/1646 Iporous product 18/1646 Iporous product 18/1646 Iporous product 18/1646 Iporous product 18/165 Ifferite or more layers only obtained by electroless plating 18/165 Ifferite or more layers only obtained by electroless plating 18/165 Ifferite or more layers only obtained by electroless plating 18/165 Ifferite or more layers with at least one layer obtained by electroless plating 18/165 Process features 18/165 Process features 18/165 Process features 18/165 Ifferite or more layers with at least one layer obtained by electroless plating and one layer obtained by electroless plating and one layer obtained by electrolasting and one layer obtained by electrolastic of the end of the process 18/1657 Process features 18/1658 18/1659 18			
Holl. 21(7286)			
18/1646 Characteristics of the product obtained 18/1646 Characteristics of the product (layered product 18/165 Challidapered product (layered product 18/1837 (Multitage pretreatment) 18/1651 (Two or more layers only obtained by electroless plaining) 18/1651 (Two or more layers with at least one layer obtained by electroless plaining) 18/1653 (Two or more layers with at least one layer obtained by electroless plaining) 18/1655 (Process features) 18/1657 (Pieteroless forning, i.e. substrate removed or destroyed at the end of the process) 18/1658 (with two steps starting with metal deposition followed by addition of reducing agent) (with two steps starting with addition of reducing agent) (with two steps starting with addition of reducing agent) (18/1662 (19/1646)	18/1642		
18/1648 Porous product 18/165 Multilayered product (byered product 18/1837 Multilayered product (byered product 18/1841 (with use of metal first) 18/1651 Town or more layers only obtained by 18/1844 (with use of organic or inorganic centrogands other than metals, first) 18/1653 Town or more layers with at least one layer obtained by electroless plating and layer obtained by electroless plating and one layer obtained by electroless plating and plating in organic material 18/1657 [Electroless furning, its abstrate] 18/1858 (18/1868 (18/1869 (18/1868) (18/1869 (18/1868) (18/	18/1644	• • • • {porous substrates}	18/1834 {Use of organic or inorganic compounds
18/165 Multilatyered product (layered product B22b)	18/1646	• • • {Characteristics of the product obtained}	
Barrier Barr	18/1648	• • • • {Porous product}	sensitisation with polymers}
18/1651 Carbo or more layers only obtained by electroses plating electroses plating 18/1848 (by electrochemical pretreatment) 18/1653 Carbo or more layers with at least one layer obtained by electropless plating and one layer obtained by electroplating 18/1851 (of surfaces of non-metallic or semiconducting in organic material) 18/1657 (Electroless forming, i.e. substrate removed or destroyed at the end of the process) 18/1658 (with two steps starting with metal deposition) (With two steps starting with metal deposition) (Use of incorporated material in the solution or dispersion, e.g. particles, whiskers, wires) 18/1662 (Use of incorporated material in the solution or dispersion, e.g. particles, whiskers, wires) 18/1868 (Radiation, e.g. Uv, laser) 18/1867 (Radiation, e.g. ari introduction) 18/1868 (Agration, e.g. ari introduction) 18/1869 (Agration) (Agra	18/165	{Multilayered product (layered product	18/1837 • • • • • {Multistep pretreatment}
electroless platins] 18/1653 [Two or more layers with at least one layer obtained by electroless plating and one layer obtained by electroless plating and one layer obtained by electroless forming, i.e. substrate removed or destroyed at the end of the process] 18/1657 [Flectroless forming, i.e. substrate removed or destroyed at the end of the process] 18/1658 (with two steps starting with metal deposition followed by addition of reducing agent followed by addition of reducing agent followed by addition of reducing agent followed by metal deposition of reducing agent followed by metal deposition of reducing agent followed by metal deposition of respective gate of the process of the pro		<u>B32B</u>)}	18/1841 { with use of metal first}
18/1653 (Two or mone layers with at least one layer obtained by electroless plaing and one layer obtained by electroless plaining and one layer of the grant plaining and of the process of the layer of reducing agent plaining and in organic material. It 18/1856 (Use of incorporated material in the solution) 18/1857 (Use of incorporated material in the solution) 18/1859 (Use of organic or inorganic compounds other than metals, e.g. activation, sensitisation with polymers) (Use of organic or inorganic compounds other than metals, e.g. activation, sensitisation with polymers) (Use of organic or inorganic compounds other than metals, e.g. activation, sensitisation with polymers) (Use of organic or inorganic compounds other than metals, e.g. activation, sensitisation with polymers) (Use of organic or inorganic compounds other than metals, e.g. activation, sensitisation with polymers) (18/1651		
layer obtained by electroless plating and one layer obtained by electroless plating and one layer obtained by electroless forming. i.e. substrate removed or destroyed at the end of the process [18/1657] [Electroless forming, i.e. substrate removed or destroyed at the end of the process] [18/1658] [Vith two steps starting with metal deposition followed by addition of reducing agent] [18/166] [Vith two steps starting with addition of reducing agent followed by metal deposition) [18/166] [Vision or depersion, e.g. particles, whiskers, wires) [18/166] [Vith additional mans during the plating process] [18/186] [Vith additional mans during the plating process] [18/186] [Vith additional mans during the plating process] [18/187] [Vitrasonics] [Vitrasonics] [18/188] [Vitrasonics] [V	18/1653	*	
18/1657 Process features 18/1857 Process features 18/1857 Process 18/1857 Process 18/1857 Process 18/1858 Pretreatment Pretreatment Process Pretreatment		layer obtained by electroless plating and	18/1851 {of surfaces of non-metallic or semiconducting
Relictroless forming, i.e. substrate removed or destroyed at the end of the process (with two steps starting with metal deposition)	10/1655		
removed or destroyed at the end of the process removed or destroyed at the end of the process liking to steps starting with metal deposition followed by addition of reducing agent see also C32C 18/1855 - C32C 18/1896 are not complete, pending reorganisation. See also C32C 18/1818 liking agent see also C32C 18/185 liking reorganisation of reducing agent followed by metal deposition of for reducing agent followed by metal deposition of deposition or dispersion, e.g. particles, whiskers, wires liking liki			
Bil 1658 with two steps starting with metal deposition followed by addition of reducing agent of reducing agent followed by metal deposition of supersion, e.g. particles, solution or dispersion, e.g. particles, whiskers, wires 18/1662 (Use of incorporated material in the solution or dispersion, e.g. particles, whiskers, wires) 18/1664 (with additional means during the plating process) 18/1875 (by chemical, e.g. activation, e.g. theat) (by metal energy) (by chemical, e.g. activation, sensitisation with noble metals) 18/1876 (Use aforganic or inorganic compounds other than metals, e.g. activation, sensitisation with polymers) 18/1675 (Process conditions) 18/1886 (Multistep pretreatment) 18/1678 (Heating of the substrate) 18/1683 (Control of temperature, e.g. temperature of bath, substrate) 18/1682 (Control of electrolyte composition, e.g. measurement, adjustment (regeneration of bath C23C 18/1617) (Cooling, e.g. forced or controlled cooling) 18/1689 (After-treatment) 18/1689 (After-treatment) (Cooling, e.g. forced or controlled cooling) 18/1690 (Control of atmosphere) 18/1690 (Fleat-treatment) 18/1690 (Control of atmosphere) 18/1690 (Control of temperature) 18/1690 (Control of temperature) 18/1690 (Fleat-treatment)	18/165/	removed or destroyed at the end of the	
deposition followed by addition of reducing agent 18/166		* *	
of reducing agent followed by metal deposition 18/1662	18/1658	deposition followed by addition of	are not complete, pending reorganisation.
latiofication of reducing agent followed by metal deposition of dispersion, e.g. particles, whiskers, wires with additional means during the plating process] 18/1664	18/166	• • • • { with two steps starting with addition	18/1959 [by formation of alastrostatic charges a g
18/1662 (Use of incorporated material in the solution or dispersion, e.g. particles, whiskers, wires) 18/1865 (Heat) (with additional means during the plating process) 18/1866 (With additional means during the plating process) 18/1875 (only one step pretreatment) 18/1866 (Ultrasonics) 18/1879 (Use of metal, e.g. activation, sensitisation with noble metals) 18/1871 (Use of remains corpinounds other than metals, e.g. activation, sensitisation with polymers) 18/1673 (Magnetic field) 18/1675 (Process conditions) 18/1886 (Multistep pretreatment) 18/1678 (Heating of the solution) 18/1678 (Heating of the substrate) 18/1682 (Control of temperature, e.g. temperature of bath, substrate) 18/1682 (Control of electrolyte composition, e.g. measurement, adjustment (regeneration of bath C23C 18/1617) 18/1687 (with isonic liquid) 18/1687 (with isonic liquid) 18/1687 (With isonic liquid) 18/1687 (Fertreatment) 18/1687 (Fertreatment) 18/1687 (Fertreatment) 18/1687 (Fertreatment) 18/1688 (After-treatment) 18/1689 (After-treatment) 18/1690 (Cooling, e.g. forced or controlled cooling) 18/1694 (Sequential heat treatment) 18/1695 (Control of atmosphere) 18/1698 (Control of temperature) 18/1698 (Control of temperature) 18/1698 (Control of atmosphere) 18/1698 (Control of temperature) 18/202 (by formation of electrostatic charges, e.g. tribofriction) 18/1698 (Control of temperature) 18/204 (Radiation, e.g. tribofriction) 18/1698 (Control of temperature) 18/204 (Radiation, e.g. UV, laser) 18/204 (Radiation, e.g.			tribofriction}
solution or dispersion, e.g. particles, whiskers, wires} 18/1664	18/1662	- · · · · · · · · · · · · · · · · · · ·	
whiskers, wires} 18/1664	10,1002		
18/1664			
18/1666 Control of temperature of bath C23C 18/1617) 18/1687 Flatter tement 18/1688 Flatter tement 18/1688 Flatter tement 18/1688 Flatter tement 18/1688 Flatter tement 18/1687 Flatter tement 18/1689 Flatter tement 18/1690 Flatte	18/1664		18/1872 {by chemical pretreatment}
18/1666 . {Ultrasonics} 18/1667 . {Radiant energy, e.g. laser} 18/1669 . {Agitation, e.g. air introduction} 18/1671 . {Electric field} 18/1673 . {Magnetic field} 18/1675 . {Process conditions} 18/1676 . {Heating of the solution} 18/1676 . {Heating of the solution} 18/1678 . {Heating of the substrate} 18/168 . {Control of temperature, e.g. temperature of bath, substrate} 18/168 . {Control of atmosphere} 18/1681 . {Control of electrolyte composition, e.g. measurement, adjustment (regeneration of bath C23C 18/1617) 18/1685 . {with supercritical condition, e.g. chemical fluid deposition} 18/1687 . {with isupercritical condition, e.g. chemical fluid deposition} 18/1689 . {After-treatment} 18/1689 . {Control of atmosphere} 18/1690 . {Cooling, e.g. forced or controlled cooling} 18/1691 . {Cooling, e.g. forced or controlled cooling} 18/1692 . {Control of atmosphere} 18/1693 . {Control of atmosphere} 18/1694 . {Sequential heat treatment} 18/1695 . {Control of atmosphere} 18/1696 . {Control of atmosphere} 18/1697 . {Radiation, e.g. chemical fluid deposition} 18/1698 . {Control of atmosphere} 18/1800 . {of organic or inorganic on inorganic other than metals, e.g. activation, sensitisation with polymers} 18/1696 . {Control of atmosphere} 18/1691 . {by mechanical pretreatment} 18/202 . {by other methods than those of C23C 18/201 - C23C 18/2093 are not complete, pending reorganisation. See also C23C 18/2006 . {by remain of electrostatic charges, e.g. tribofriction} 18/1691 . {by other methods than those of C23C 18/2006 . {by radiant energy} 18/1691 . {by other methods than those of C23C 18/2006 . {by remain of electrostatic charges, e.g. tribofriction} 18/1691 . {by mechanical pretreatment} 18/202 . {by other methods than those of C23C 18/2003 are not complete, pending reorganisation. See al			18/1875 {only one step pretreatment}
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18/181 {by formation of electrostatic charges, e.g.	18/1806	• • • {by mechanical pretreatment, e.g. grinding,	18/2053 {only one step pretreatment}
	18/181	• • • • {by formation of electrostatic charges, e.g.	

18/206	• • • • • • {Use of metal other than noble metals and tin, e.g. activation, sensitisation		urface treatment of metallic material by reaction of with a reactive medium
	with metals (sensitising with tin <u>C23C 18/285</u> , sensitising with noble metals <u>C23C 18/30</u>)}	22/00	Chemical surface treatment of metallic material by reaction of the surface with a reactive liquid, leaving reaction products of surface material in
18/2066	{Use of organic or inorganic compounds other than metals,		the coating, e.g. conversion coatings, passivation of metals
	e.g. activation, sensitisation with polymers}		NOTES
18/2073	{Multistep pretreatment}		This group <u>covers</u> also suspensions containing
18/208	• • • • • { with use of metal first }		reactive liquids and non-reactive solid particles.
18/2086	• • • • • • { with use of organic or inorganic compounds other than metals, first }		2. In groups C23C 22/02 - C23C 22/86, in the absence of an indication to the contrary,
18/2093 18/22	{by electrochemical pretreatment}		classification is made in the last appropriate place.
18/24	Roughening, e.g. by etching using acid aqueous solutions		3. Rejuvenating of the bath is classified in
18/26	using actu aqueous solutions using organic liquids		the appropriate place for the specific bath composition.
18/28	Sensitising or activating		•
18/285	• • • • • • • • • • • • • • • • • • •	22/02	 using non-aqueous solutions
	compound or composition}	22/03	containing phosphorus compounds
18/30	Activating {or accelerating or sensitising	22/04	containing hexavalent chromium compounds
	with palladium or other noble metal}	22/05	 using aqueous solutions
18/31	Coating with metals	22/06	using aqueous acidic solutions with pH less than
18/32	Coating with nickel, cobalt or mixtures thereof	22/07	6
	with phosphorus or boron (C23C 18/50 takes	22/07	containing phosphatesOrthophosphates
10/24	precedence)	22/08	containing oxidants
18/34 18/36	 using reducing agents using hypophosphites	22/10	containing oxidants containing zinc cations
18/38	Coating with copper	22/13	containing also nitrate or nitrite anions
18/40	using reducing agents	22/14	containing also chlorate anions
18/405	· · · · {Formaldehyde}	22/16	containing also peroxy-compounds
18/42	Coating with noble metals	22/17	containing also organic acids
18/44	using reducing agents	22/18	containing manganese cations
18/48	Coating with alloys	22/182	{containing also zinc cations}
18/50	with alloys based on iron, cobalt or nickel	22/184	{containing also nickel cations}
18/52	using reducing agents for coating with metallic	22/186	• • • • • {containing also copper cations}
	material not provided for in a single one of groups	22/188	• • • • {containing also magnesium cations}
	C23C 18/32 - C23C 18/50	22/20	containing aluminium cations
18/54	Contact plating, i.e. electroless electrochemical	22/22	containing alkaline earth metal cations
	plating	22/23	Condensed phosphates
20/00	Chemical coating by decomposition of either solid	22/24	containing hexavalent chromium compounds
	compounds or suspensions of the coating forming	22/26	containing also organic compounds
	compounds, without leaving reaction products of	22/27	Acids
	surface material in the coating	22/28 22/30	 Macromolecular compounds containing also trivalent chromium
	<u>NOTE</u>	22/30	containing also pulverulent metals
	This group <u>covers</u> also suspensions containing	22/33	containing also phosphates
	non-reactive liquids and reactive solid particles.	22/34	containing fluorides or complex fluorides
20/02	Coating with metallic material	22/36	containing also phosphates
20/02	with metals	22/361	{containing titanium, zirconium or
20/04	 Coating with inorganic material, other than metallic 		hafnium compounds}
20/00	material	22/362	• • • • {containing also zinc cations}
20/08	• • with compounds, mixtures or solid solutions, e.g.	22/364	• • • • {containing also manganese cations}
	borides, carbides, nitrides	22/365	• • • • • {containing also zinc and nickel cations}
		22/367	• • • • {containing alkaline earth metal cations}
		22/368	• • • • {containing magnesium cations}
		22/37	containing also hexavalent chromium compounds
		22/38	containing also phosphates
		22/40	containing molybdates, tungstates or vanadates
		22/42	containing also phosphates

22/43	containing also hexavalent chromium compounds	24/103	• • • {Coating with metallic material, i.e. metals or metal alloys, optionally comprising hard
22/44	 containing also fluorides or complex fluorides 	24/106	particles, e.g. oxides, carbides or nitrides} {Coating with metal alloys or metal elements
22/46	containing oxalates		only}
22/47	containing also phosphates	26/00	Continue of march 1, 1 for the march
22/48	not containing phosphates, hexavalent	26/00	Coating not provided for in groups
	chromium compounds, fluorides or complex	26/02	C23C 2/00 - C23C 24/00
	fluorides, molybdates, tungstates, vanadates or	26/02	applying molten material to the substrate
	oxalates	28/00	Coating for obtaining at least two superposed
22/50	Treatment of iron or alloys based thereon		coatings either by methods not provided for in
22/52	Treatment of copper or alloys based thereon		a single one of groups <u>C23C 2/00</u> - <u>C23C 26/00</u>
22/53	Treatment of zinc or alloys based thereon		or by combinations of methods provided for in
22/54	Treatment of refractory metals or alloys		subclasses <u>C23C</u> and <u>C25C</u> or <u>C25D</u>
	based thereon	28/02	 only coatings {only including layers} of metallic
22/56	Treatment of aluminium or alloys based		material
	thereon	28/021	{including at least one metal alloy layer}
22/57	Treatment of magnesium or alloys based	28/022	• • • {with at least one MCrAIX layer}
	thereon	28/023	• • {only coatings of metal elements only}
22/58	Treatment of other metallic material	28/025	• • • {with at least one zinc-based layer}
22/60	• using alkaline aqueous solutions with pH greater	28/026	• • {including at least one amorphous metallic
	than 8		material layer}
22/62	Treatment of iron or alloys based thereon	28/027	• • {including at least one metal matrix material
22/63	Treatment of copper or alloys based thereon		comprising a mixture of at least two metals or
22/64	Treatment of refractory metals or alloys based thereon		metal phases or metal matrix composites, e.g. metal matrix with embedded inorganic hard particles, CERMET, MMC.}
22/66	Treatment of aluminium or alloys based	28/028	Including graded layers in composition or in
22/67	thereon	20,020	physical properties, e.g. density, porosity, grain
22/67	with solutions containing hexavalent chromium		size}
22/68		28/04	only coatings of inorganic non-metallic material
22/70	 using aqueous solutions with pH between 6 and 8 using melts 	28/042	• • {including a refractory ceramic layer, e.g.
22/72	_		refractory metal oxides, ZrO ₂ , rare earth oxides}
22/72	 Treatment of iron or alloys based thereon characterised by the process 	28/044	• • {coatings specially adapted for cutting tools or
22/74	 characterised by the process for obtaining burned-in conversion coatings 		wear applications}
22/74	Applying the liquid by spraying	28/046	• • { with at least one amorphous inorganic material
22/77	Applying the liquid by spraying Controlling or regulating of the coating process		layer, e.g. DLC, a-C:H, a-C:Me, the layer being
22/78	Pretreatment of the material to be coated		doped or not}
22/80		28/048	• • {with layers graded in composition or physical
22/80	 with solutions containing titanium or zirconium compounds 		properties}
22/82	After-treatment	28/30	• {Coatings combining at least one metallic layer and
22/83	Chemical after-treatment	20/22	at least one inorganic non-metallic layer}
22/84	. Dyeing	28/32	• • {including at least one pure metallic layer}
22/84	Regeneration of coating baths	28/321	• • { with at least one metal alloy layer}
22/00	. Regeneration of coating baths	28/3215	• • • • {at least one MCrAIX layer}
24/00	Coating starting from inorganic powder (spraying	28/322	• • • {only coatings of metal elements only}
	of the coating material in molten state <u>C23C 4/00</u> ;	28/3225	• • • { with at least one zinc-based layer}
	solid state diffusion <u>C23C 8/00</u> - <u>C23C 12/00</u>)	28/323	• • • { with at least one amorphous metallic material
24/02	 by application of pressure only 	20/224	layer}
24/04	Impact or kinetic deposition of particles	28/324	 . • {with at least one metal matrix material layer comprising a mixture of at least two metals or
24/045	• • • {by trembling using impacting inert media}		metal phases or a metal-matrix material with
24/06	 Compressing powdered coating material, e.g. by milling 	20/227	hard embedded particles, e.g. WC-Me}
24/08	 by application of heat or pressure and heat 	28/325	• • • {with layers graded in composition or in
	(C23C 24/04 takes precedence)	29/24	physical properties }
24/082	• • {without intermediate formation of a liquid in the	28/34	 • {including at least one inorganic non-metallic material layer, e.g. metal carbide, nitride, boride,
	layer}		silicide layer and their mixtures, enamels,
24/085	• • • {Coating with metallic material, i.e. metals		phosphates and sulphates}
	or metal alloys, optionally comprising hard	28/341	 { with at least one carbide layer}
	particles, e.g. oxides, carbides or nitrides}	28/343	• • • {with at least one Carotac Tayer} • • • {with at least one DLC or an amorphous carbon
24/087	• • • • {Coating with metal alloys or metal elements	20/343	based layer, the layer being doped or not}
04/10	only}	28/345	• • • {with at least one oxide layer}
24/10	with intermediate formation of a liquid phase in the layer		. (

28/3455	• • • { with a refractory ceramic layer, e.g. refractory metal oxide, ZrO ₂ , rare earth oxides or a thermal barrier system comprising at least one refractory oxide layer}
28/347	• • • { with layers adapted for cutting tools or wear applications }
28/36	 {including layers graded in composition or physical properties}
28/40	• {Coatings including alternating layers following a pattern, a periodic or defined repetition}
28/42	 {characterized by the composition of the alternating layers}
28/44	• • {characterized by a measurable physical property of the alternating layer or system, e.g. thickness, density, hardness}
30/00	Coating with metallic material characterised only by the composition of the metallic material, i.e. not characterised by the coating process (C23C 26/00, C23C 28/00 take precedence)
30/005	• {on hard metal substrates}

2222/00	Aspects relating to chemical surface treatment of metallic material by reaction of the surface with a reactive medium
2222/10	• Use of solutions containing trivalent chromium but
	free of hexavalent chromium
2222/20	Use of solutions containing silanes