

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY (NOTE omitted)

H01 ELECTRIC ELEMENTS (NOTES omitted)

H01L SEMICONDUCTOR DEVICES NOT COVERED BY CLASS [H10](#) (use of semiconductor devices for measuring [G01](#); resistors in general [H01C](#); magnets, inductors or transformers [H01F](#); capacitors in general [H01G](#); electrolytic devices [H01G 9/00](#); batteries or accumulators [H01M](#); waveguides, resonators or lines of the waveguide type [H01P](#); line connectors or current collectors [H01R](#); stimulated-emission devices [H01S](#); electromechanical resonators [H03H](#); loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers [H04R](#); electric light sources in general [H05B](#); printed circuits, hybrid circuits, casings or constructional details of electrical apparatus, manufacture of assemblages of electrical components [H05K](#); use of semiconductor devices in circuits having a particular application, see the subclass for the application)

NOTES

1. This subclass is residual to class [H10](#).
2. This subclass covers:
 - a. semiconductor devices for rectifying, amplifying, oscillating or switching; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
 - b. semiconductor devices sensitive to radiation; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
 - c. semiconductor devices for light emission; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
 - d. processes or apparatus for the manufacture or treatment of semiconductor or solid-state devices where the type of device is not listed under bullets a to c, above, or not essential;
 - e. constructional details or arrangements of semiconductor or solid-state devices not covered by class [H10](#) and not specific to types of devices listed under bullets a to c, above;
 - f. packaging or assembling of semiconductor or solid-state devices covered by this subclass or by class [H10](#).
3. In this subclass, the following terms or expressions are used with the meaning indicated:
 - "wafer" means a slice of semiconductor or crystalline substrate material, which can be modified by impurity diffusion (doping), ion implantation or epitaxy, and whose active surface can be processed into arrays of discrete components or integrated circuits;
 - "solid state body" means the body of material within which, or at the surface of which, the physical effects characteristic of the device occur;
 - "electrode" is a region in or on the body of the device (other than the solid state body itself), which exerts an electrical influence on the solid state body, irrespective of whether or not an external electrical connection is made thereto. An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions, only those portions which exert an influence on the solid state body by virtue of their shape, size, or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads;
 - "device" means an electric circuit element; where an electric circuit element is one of a plurality of elements formed in or on a common substrate; it is referred to as a "component";
 - "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g. electroforming, before it is ready for use but which does not require the addition of further structural units;
 - "parts" includes all structural units which are included in a complete device;
 - "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation";
 - "integrated circuit" is a device where all components, e.g. diodes or resistors, are built up on a common substrate and form the device including interconnections between the components;
 - "assembly" of a device is the building up of the device from its constructional units; the term covers the provision of fillings in containers.

(continued)

4. In this subclass, both the process or apparatus for the manufacture or treatment of a device and the device itself are classified, whenever both of these are described sufficiently to be of interest.
5. Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the Periodic Table of chemical elements the CPC refers. In this subclass, the system used is the 8 group system, indicated by Roman numerals in the Periodic Table thereunder.

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:

H01L 21/203	covered by	H01L 21/02631
H01L 21/205	covered by	H01L 21/0262
H01L 21/208	covered by	H01L 21/02623
H01L 21/301	covered by	H01L 21/30
H01L 21/36 - H01L 21/368	covered by	H01L 21/02107
H01L 21/58	covered by	H01L 24/80
H01L 21/66	covered by	H01L 22/00
H01L 21/98	covered by	H01L 25/50
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.}
3. Due to the ongoing developments in class [H10](#) and related subclasses, the information displayed in notes, references and definitions of this subclass may not be entirely accurate. For each specific subject matter referred to in this subclass, users are invited to consult the relevant place in class [H10](#) and to consider the class [H10](#) information as correct, in case of conflict.

21/00 Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof

NOTE

{Due to the ongoing developments in class [H10](#) and related subclasses, the information displayed in notes, references and definitions of this main group and indents may not be entirely accurate. For each specific subject matter referred to in this main group and indents, users are invited to consult the relevant place in class [H10](#) and to consider the class [H10](#) information as correct, in case of conflict}

21/02 . . . {Manufacture or treatment of semiconductor devices or of parts thereof}

21/02002 . . . {Preparing wafers}

NOTES

1. {This group covers processes for manufacturing wafers prior to the fabrication of any device, i.e. between the sawing of ingots (covered by [B28D](#)) and the cleaning of substrates (covered by [H01L 21/02041](#)). }
2. {This group does not cover:
 - simple use of grinding or polishing machines [B24B](#)
 - thermal smoothening [H01L 21/324](#). }

21/02005 . . . {Preparing bulk and homogeneous wafers}

21/02008 . . . {Multistep processes}

21/0201 . . . {Specific process step}

21/02013 . . . {Grinding, lapping}

21/02016 . . . {Backside treatment}

21/02019 . . . {Chemical etching}

21/02021 . . . {Edge treatment, chamfering}

21/02024 . . . {Mirror polishing}

21/02027 . . . {Setting crystal orientation}

21/0203 . . . {Making porous regions on the surface}

21/02032 . . . {by reclaiming or re-processing}

21/02035 . . . {Shaping}

21/02041 . . . {Cleaning}

21/02043 . . . {Cleaning before device manufacture, i.e. Begin-Of-Line process}

21/02046 . . . {Dry cleaning only ([H01L 21/02085](#) takes precedence)}

21/02049 . . . {with gaseous HF}

21/02052 . . . {Wet cleaning only ([H01L 21/02085](#) takes precedence)}

21/02054 . . . {combining dry and wet cleaning steps ([H01L 21/02085](#) takes precedence)}

21/02057 . . . {Cleaning during device manufacture}

21/0206 . . . {during, before or after processing of insulating layers}

21/02063 . . . {the processing being the formation of vias or contact holes}

21/02065 . . . {the processing being a planarization of insulating layers}

21/02068 . . . {during, before or after processing of conductive layers, e.g. polysilicon or amorphous silicon layers}

21/02071 . . . {the processing being a delineation, e.g. RIE, of conductive layers}

21/02074 . . . {the processing being a planarization of conductive layers}

21/02076 . . . {Cleaning after the substrates have been singulated}

21/02079 . . . {Cleaning for reclaiming}

21/02082 . . . {product to be cleaned}

21/02085 . . . {Cleaning of diamond}

21/02087 . . . {Cleaning of wafer edges}

21/0209 . . . {Cleaning of wafer backside}

21/02093 . . . {Cleaning of porous materials}

21/02096 . . . {only mechanical cleaning}

21/02098 . . . {only involving lasers, e.g. laser ablation}

21/02101 . . . {only involving supercritical fluids}

21/02104 . . . {Forming layers ([deposition in general C23C](#); [crystal growth in general C30B](#))}

21/02107 . . . {Forming insulating materials on a substrate}

- 21/02109 {characterised by the type of layer, e.g. type of material, porous/non-porous, pre-cursors, mixtures or laminates}
- 21/02112 {characterised by the material of the layer}

NOTE

{Layers comprising sublayers, i.e. multi-layers, are additionally classified in [H01L 21/022](#); porous layers are additionally classified in [H01L 21/02203](#).}

- 21/02115 {the material being carbon, e.g. alpha-C, diamond or hydrogen doped carbon}
- 21/02118 {carbon based polymeric organic or inorganic material, e.g. polyimides, poly cyclobutene or PVC (polymers per se [C08G](#), photoresist per se [G03F](#))}
- 21/0212 {the material being fluoro carbon compounds, e.g.(CF_x)_n, (CH_xF_y)_n or polytetrafluoroethylene}
- 21/02123 {the material containing silicon}
- 21/02126 {the material containing Si, O, and at least one of H, N, C, F, or other non-metal elements, e.g. SiOC, SiOC:H or SiONC}
- 21/02129 {the material being boron or phosphorus doped silicon oxides, e.g. BPSG, BSG or PSG}

NOTE

{Halogen, e.g. fluorine, containing BPSG, PSG, BSG, and the like, are additionally classified in [H01L 21/02131](#).}

- 21/02131 {the material being halogen doped silicon oxides, e.g. FSG}
- 21/02134 {the material comprising hydrogen silsesquioxane, e.g. HSQ}
- 21/02137 {the material comprising alkyl silsesquioxane, e.g. MSQ}
- 21/0214 {the material being a silicon oxynitride, e.g. SiON or SiON:H}
- 21/02142 {the material containing silicon and at least one metal element, e.g. metal silicate based insulators or metal silicon oxynitrides}
- 21/02145 {the material containing aluminium, e.g. AlSiOx}
- 21/02148 {the material containing hafnium, e.g. HfSiOx or HfSiON}
- 21/0215 {the material containing tantalum, e.g. TaSiOx}
- 21/02153 {the material containing titanium, e.g. TiSiOx}
- 21/02156 {the material containing at least one rare earth element, e.g. silicate of lanthanides, scandium or yttrium}
- 21/02159 {the material containing zirconium, e.g. ZrSiOx}
- 21/02161 {the material containing more than one metal element}

- 21/02164 {the material being a silicon oxide, e.g. SiO₂}

NOTE

{ The formation of silicon oxide layers is classified in this group regardless of the precursor or of the process of formation; in case of explicit statements on doping, on rest-groups, or on material components see [H01L 21/02126](#) and subgroups; deposition of silicon oxide from organic precursors without further statements on film composition is classified here and in [H01L 21/02205](#) and subgroups. }

- 21/02167 {the material being a silicon carbide not containing oxygen, e.g. SiC, SiC:H or silicon carbonitrides ([H01L 21/02126](#) and [H01L 21/0214](#) take precedence)}
- 21/0217 {the material being a silicon nitride not containing oxygen, e.g. Si₃N₄ or Si₃ByN_z ([H01L 21/02126](#) and [H01L 21/0214](#) take precedence)}
- 21/02172 {the material containing at least one metal element, e.g. metal oxides, metal nitrides, metal oxynitrides or metal carbides (materials containing silicon [H01L 21/02123](#); metal silicates [H01L 21/02142](#))}
- 21/02175 {characterised by the metal ([H01L 21/02197](#) takes precedence)}
- 21/02178 {the material containing aluminium, e.g. Al₂O₃}
- 21/02181 {the material containing hafnium, e.g. HfO₂}
- 21/02183 {the material containing tantalum, e.g. Ta₂O₅}
- 21/02186 {the material containing titanium, e.g. TiO₂}
- 21/02189 {the material containing zirconium, e.g. ZrO₂}
- 21/02192 {the material containing at least one rare earth metal element, e.g. oxides of lanthanides, scandium or yttrium}
- 21/02194 {the material containing more than one metal element}
- 21/02197 {the material having a perovskite structure, e.g. BaTiO₃}
- 21/022 {the layer being a laminate, i.e. composed of sublayers, e.g. stacks of alternating high-k metal oxides (adhesion layers or buffer layers [H01L 21/02304](#), [H01L 21/02362](#))}
- 21/02203 {the layer being porous}
- 21/02205 {the layer being characterised by the precursor material for deposition}
- 21/02208 {the precursor containing a compound comprising Si}
- 21/02211 {the compound being a silane, e.g. disilane, methylsilane or chlorosilane}

21/02214	{the compound comprising silicon and oxygen}	from targets or heating of source material.}
	NOTE {This group <u>does not cover</u> mixtures of a silane and oxygen.}	
21/02216	{the compound being a molecule comprising at least one silicon-oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane}	
21/02219	{the compound comprising silicon and nitrogen}	
	NOTE {This group <u>does not cover</u> mixtures of silane and nitrogen.}	
21/02222	{the compound being a silazane}	
21/02225	{characterised by the process for the formation of the insulating layer}	
21/02227	{formation by a process other than a deposition process}	
	NOTE {Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02249 , H01L 21/02255 and H01L 21/02252 , depending on the type of reaction. }	
21/02223	{formation by oxidation, e.g. oxidation of the substrate}	
21/02233	{of the semiconductor substrate or a semiconductor layer}	
21/02236	{group IV semiconductor}	
21/02238	{silicon in uncombined form, i.e. pure silicon}	
21/02241	{III-V semiconductor}	
21/02244	{of a metallic layer}	
21/02247	{formation by nitridation, e.g. nitridation of the substrate}	
21/02249	{formation by combined oxidation and nitridation performed simultaneously}	
21/02252	{formation by plasma treatment, e.g. plasma oxidation of the substrate (after treatment of an insulating film by plasma H01L 21/3105 and subgroups)}	
21/02255	{formation by thermal treatment (H01L 21/02252 takes precedence; after treatment of an insulating film H01L 21/3105 and subgroups)}	
21/02258	{formation by anodic treatment, e.g. anodic oxidation}	
21/0226	{formation by a deposition process (per se C23C)}	
21/02263	{deposition from the gas or vapour phase}	
	NOTE {This group and subgroups also cover deposition methods in which the gas or vapour is produced by physical means, e.g. ablation}	
21/02266	{deposition by physical ablation of a target, e.g. sputtering, reactive sputtering, physical vapour deposition or pulsed laser deposition}	
21/02269	{deposition by thermal evaporation (H01L 21/02293 takes precedence)}	
	NOTE {Subject matter relating to molecular beam epitaxy is classified in this group.}	
21/02271	{deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)}	
21/02274	{in the presence of a plasma [PECVD]}	
21/02277	{the reactions being activated by other means than plasma or thermal, e.g. photo-CVD}	
21/0228	{deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD}	
	NOTE {Subject matter relating to cyclic plasma CVD is additionally classified in H01L 21/02274 .}	
21/02282	{liquid deposition, e.g. spin-coating, sol-gel techniques, spray coating}	
21/02285	{Langmuir-Blodgett techniques}	
21/02288	{printing, e.g. ink-jet printing (per se B41J)}	
21/0229	{liquid atomic layer deposition}	
21/02293	{formation of epitaxial layers by a deposition process (epitaxial growth per se C30B)}	
	NOTE {Formation of non-epitaxial layers by MBE, ALE, etc. is not covered by this group; for MBE see H01L 21/02269 ; for ALE see H01L 21/0228 .}	
21/02296	{characterised by the treatment performed before or after the formation of the layer (H01L 21/02227 and subgroups take precedence)}	
	NOTE {This group and subgroups only cover processes which are directly linked to the layer formation; routine anneals, i.e. thermal treatment without further features like a special atmosphere, presence of a plasma, thermally induced chemical reactions, change of phase (crystal structure) etc. are not classified here; for cleaning see H01L 21/02041 and subgroups; for etching processes see H01L 21/311 and	

H01L

H01L 21/02296

(continued)

subgroups; for planarization processes see [H01L 21/31051](#) and subgroups; for processes to repair etch damage see [H01L 21/3105](#) and subgroups. }

21/02299 {pre-treatment}

NOTE

{This group and subgroups cover treatments to improve adhesion or change the surface termination; for etching see [H01L 21/306](#) and subgroups and [H01L 21/311](#) and subgroups. }

21/02301 {in-situ cleaning}

NOTE

{Subject matter relating to the cleaning processes for semiconductor devices in general is covered by [H01L 21/02041](#) and subgroups. }

21/02304 {formation of intermediate layers, e.g. buffer layers, layers to improve adhesion, lattice match or diffusion barriers}

21/02307 {treatment by exposure to a liquid}

21/0231 {treatment by exposure to electromagnetic radiation, e.g. UV light}

21/02312 {treatment by exposure to a gas or vapour}

21/02315 {treatment by exposure to a plasma}

21/02318 {post-treatment}

NOTE

{This group only covers processes that are part of the layer formation; treatments which are performed after completion of the insulating layer are covered by [H01L 21/3105](#) and subgroups. }

21/02321 {introduction of substances into an already existing insulating layer ([H01L 21/02227](#) and subgroups take precedence)}

NOTE

{Processes like the introduction of phosphorus into silicon oxide by diffusion, or doping of an already existing insulating layer are covered by this group and subgroups; for the method of introduction, see [H01L 21/02337](#), [H01L 21/02343](#), [H01L 21/02345](#) and subgroups. }

21/02323 {introduction of oxygen}

21/02326 {into a nitride layer, e.g. changing SiN to SiON}

21/02329 {introduction of nitrogen}

21/02332 {into an oxide layer, e.g. changing SiO to SiON}

21/02334 {in-situ cleaning after layer formation, e.g. removing process residues}

NOTE

{Subject matter relating to the cleaning processes for semiconductor devices in general is covered by [H01L 21/02041](#) and subgroups. }

21/02337 {treatment by exposure to a gas or vapour}

21/0234 {treatment by exposure to a plasma}

21/02343 {treatment by exposure to a liquid}

21/02345 {treatment by exposure to radiation, e.g. visible light}

21/02348 {treatment by exposure to UV light}

21/02351 {treatment by exposure to corpuscular radiation, e.g. exposure to electrons, alpha-particles, protons or ions}

21/02354 {using a coherent radiation, e.g. a laser}

21/02356 {treatment to change the morphology of the insulating layer, e.g. transformation of an amorphous layer into a crystalline layer}

21/02359 {treatment to change the surface groups of the insulating layer}

21/02362 {formation of intermediate layers, e.g. capping layers or diffusion barriers}

21/02365 . . . {Forming inorganic semiconducting materials on a substrate}

21/02367 {Substrates}

21/0237 {Materials}

21/02373 {Group 14 semiconducting materials}

21/02376 {Carbon, e.g. diamond-like carbon}

21/02378 {Silicon carbide}

21/02381 {Silicon, silicon germanium, germanium}

21/02384 {including tin}

21/02387 {Group 13/15 materials}

21/02389 {Nitrides}

21/02392 {Phosphides}

21/02395 {Arsenides}

21/02398 {Antimonides}

21/024 {Group 12/16 materials}

21/02403 {Oxides}

21/02406 {Sulfides}

21/02409 {Selenides}

21/02411 {Tellurides}

21/02414 {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}

21/02417 {Chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}

21/0242 {Crystalline insulating materials}

21/02422 {Non-crystalline insulating materials, e.g. glass, polymers}

21/02425 {Conductive materials, e.g. metallic silicides}

21/02428 {Structure}

21/0243 {Surface structure}

21/02433 {Crystal orientation}

21/02436		{Intermediate layers between substrates and deposited layers}	21/02573		{Conductivity type}
21/02439		{Materials}	21/02576		{N-type}
21/02441		{Group 14 semiconducting materials}	21/02579		{P-type}
21/02444		{Carbon, e.g. diamond-like carbon}	21/02581		{Transition metal or rare earth elements}
21/02447		{Silicon carbide}	21/02584		{Delta-doping}
21/0245		{Silicon, silicon germanium, germanium}	21/02587		{Structure}
21/02452		{including tin}	21/0259		{Microstructure}
21/02455		{Group 13/15 materials}	21/02592		{amorphous}
21/02458		{Nitrides}	21/02595		{polycrystalline}
21/02461		{Phosphides}	21/02598		{monocrystalline}
21/02463		{Arsenides}	21/02601		{Nanoparticles (fullerenes H10K 85/211)}
21/02466		{Antimonides}	21/02603		{Nanowires}
21/02469		{Group 12/16 materials}	21/02606		{Nanotubes (carbon nanotubes H10K 85/211)}
21/02472		{Oxides}	21/02609		{Crystal orientation}
21/02474		{Sulfides}	21/02612		{Formation types}
21/02477		{Selenides}	21/02614		{Transformation of metal, e.g. oxidation, nitridation}
21/0248		{Tellurides}	21/02617		{Deposition types}
21/02483		{Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}	21/0262		{Reduction or decomposition of gaseous compounds, e.g. CVD}
21/02485		{Other chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}	21/02623		{Liquid deposition}
21/02488		{Insulating materials}	21/02625		{using melted materials}
21/02491		{Conductive materials}	21/02628		{using solutions}
21/02494		{Structure}	21/02631		{Physical deposition at reduced pressure, e.g. MBE, sputtering, evaporation}
21/02496		{Layer structure}	21/02634		{Homoepitaxy}
21/02499		{Monolayers}	21/02636		{Selective deposition, e.g. simultaneous growth of mono- and non-monocrystalline semiconductor materials}
21/02502		{consisting of two layers}	21/02639		{Preparation of substrate for selective deposition}
21/02505		{consisting of more than two layers}	21/02642		{Mask materials other than SiO ₂ or SiN}
21/02507		{Alternating layers, e.g. superlattice}	21/02645		{Seed materials}
21/0251		{Graded layers}	21/02647		{Lateral overgrowth}
21/02513		{Microstructure}	21/0265		{Pendeoepitaxy}
21/02516		{Crystal orientation}	21/02653		{Vapour-liquid-solid growth}
21/02518		{Deposited layers}	21/02656		{Special treatments}
21/02521		{Materials}	21/02658		{Pretreatments (cleaning in general H01L 21/02041)}
21/02524		{Group 14 semiconducting materials}	21/02661		{In-situ cleaning}
21/02527		{Carbon, e.g. diamond-like carbon}	21/02664		{Aftertreatments (planarisation in general H01L 21/304)}
21/02529		{Silicon carbide}	21/02667		{Crystallisation or recrystallisation of non-monocrystalline semiconductor materials, e.g. regrowth}
21/02532		{Silicon, silicon germanium, germanium}	21/02669		{using crystallisation inhibiting elements}
21/02535		{including tin}	21/02672		{using crystallisation enhancing elements}
21/02538		{Group 13/15 materials}	21/02675		{using laser beams}
21/0254		{Nitrides}	21/02678		{Beam shaping, e.g. using a mask}
21/02543		{Phosphides}	21/0268		{Shape of mask}
21/02546		{Arsenides}	21/02683		{Continuous wave laser beam}
21/02549		{Antimonides}	21/02686		{Pulsed laser beam}
21/02551		{Group 12/16 materials}	21/02689		{using particle beams}
21/02554		{Oxides}	21/02691		{Scanning of a beam}
21/02557		{Sulfides}			
21/0256		{Selenides}			
21/02562		{Tellurides}			
21/02565		{Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}			
21/02568		{Chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}			
21/0257		{Doping during depositing}			

21/02694		{Controlling the interface between substrate and epitaxial layer, e.g. by ion implantation followed by annealing}	21/0455		{Making n or p doped regions or layers, e.g. using diffusion}
21/02697	. . .	{Forming conducting materials on a substrate}	21/046		{using ion implantation}
21/027	. .	Making masks on semiconductor bodies for further photolithographic processing not provided for in group H01L 21/18 or H01L 21/34 {(photographic masks or originals per se G03F 1/00 ; registration or positioning of photographic masks or originals G03F 9/00 ; photographic cameras G03B ; control of position G05D 3/00)}	NOTE {Processes where ion implantation of boron and subsequent annealing does not produce a p-doped region are classified elsewhere, e.g. H01L 21/0445 .}		
21/0271	. . .	{comprising organic layers}	21/0465		{using masks}
21/0272		{for lift-off processes}	21/047		{characterised by the angle between the ion beam and the crystal planes or the main crystal surface}
21/0273		{characterised by the treatment of photoresist layers}	21/0475		{Changing the shape of the semiconductor body, e.g. forming recesses, (etching of the semiconductor body H01L 21/302)}
21/0274		{Photolithographic processes}	21/048		{Making electrodes}
21/0275		{using lasers}	21/0485		{Ohmic electrodes}
21/0276		{using an anti-reflective coating (anti-reflective coating for lithography in general G03F 7/09)}	21/049		{Conductor-insulator-semiconductor electrodes, e.g. MIS contacts}
21/0277		{Electrolithographic processes}	21/0495		{Schottky electrodes}
21/0278		{Röntgenlithographic or X-ray lithographic processes}	21/18	. . .	the devices having semiconductor bodies comprising elements of Group IV of the Periodic Table or $A_{III}B_V$ compounds with or without impurities, e.g. doping materials {(H01L 21/041 - H01L 21/0425 , H01L 21/045 - H01L 21/048 take precedence)}
21/0279		{Ionlithographic processes}	NOTE This group covers also processes and apparatus which, by using the appropriate technology, are clearly suitable for manufacture or treatment of devices whose bodies comprise elements of Group IV of the Periodic Table or $A_{III}B_V$ compounds, even if the material used is not explicitly specified.		
21/033	. . .	comprising inorganic layers	21/182		{Intermixing or interdiffusion or disordering of III-V heterostructures, e.g. IILD}
21/0331		{for lift-off processes}	21/185		{Joining of semiconductor bodies for junction formation}
21/0332		{characterised by their composition, e.g. multilayer masks, materials}	21/187		{by direct bonding}
21/0334		{characterised by their size, orientation, disposition, behaviour, shape, in horizontal or vertical plane}	21/20		Deposition of semiconductor materials on a substrate, e.g. epitaxial growth {solid phase epitaxy}
21/0335		{characterised by their behaviour during the process, e.g. soluble masks, redeposited masks}	21/2003		{characterised by the substrate}
21/0337		{characterised by the process involved to create the mask, e.g. lift-off masks, sidewalls, or to modify the mask, e.g. pre-treatment, post-treatment}	21/2007		{Bonding of semiconductor wafers to insulating substrates or to semiconducting substrates using an intermediate insulating layer (H01L 21/2011 takes precedence; bonding of semiconductor wafers to semiconductor wafers for junction formation H01L 21/187)}
21/0338		{Process specially adapted to improve the resolution of the mask}	21/2011		{the substrate being of crystalline insulating material, e.g. sapphire}
21/04	. .	the devices having potential barriers, e.g. a PN junction, depletion layer or carrier concentration layer	21/2015		{the substrate being of crystalline semiconductor material, e.g. lattice adaptation, heteroepitaxy}
21/0405	. . .	{the devices having semiconductor bodies comprising semiconducting carbon, e.g. diamond, diamond-like carbon}			
NOTE {This group covers passivation.}					
21/041		{Making n- or p-doped regions}			
21/0415		{using ion implantation}			
21/042		{Changing their shape, e.g. forming recesses (etching of the semiconductor body H01L 21/302)}			
21/0425		{Making electrodes}			
21/043		{Ohmic electrodes}			
21/0435		{Schottky electrodes}			
21/044		{Conductor-insulator-semiconductor electrodes}			
21/0445	. . .	{the devices having semiconductor bodies comprising crystalline silicon carbide}			
21/045		{passivating silicon carbide surfaces}			

21/22		Diffusion of impurity materials, e.g. doping materials, electrode materials, into or out of a semiconductor body, or between semiconductor regions; {Interactions between two or more impurities; Redistribution of impurities}	21/26		Bombardment with radiation {(H01L 21/3105 takes precedence)}
21/2205		{from the substrate during epitaxy, e.g. autodoping; Preventing or using autodoping}	21/2605		{using natural radiation, e.g. alpha, beta or gamma radiation}
21/221		{of killers}	21/261		to produce a nuclear reaction transmuting chemical elements
21/2215		{in $A_{III}B_V$ compounds}	21/263		with high-energy radiation (H01L 21/261 takes precedence)
21/222		{Lithium-drift}	21/2633		{for etching, e.g. sputteretching}
21/2225		{Diffusion sources}	21/2636		{for heating, e.g. electron beam heating}
21/223		using diffusion into or out of a solid from or into a gaseous phase {(H01L 21/221 - H01L 21/222 take precedence; diffusion through an applied layer H01L 21/225)}	21/265		producing ion implantation
21/2233		{Diffusion into or out of $A_{III}B_V$ compounds}	21/26506		{in group IV semiconductors}
21/2236		{from or into a plasma phase}	21/26513		{of electrically active species}
21/225		using diffusion into or out of a solid from or into a solid phase, e.g. a doped oxide layer {(H01L 21/221 - H01L 21/222 take precedence)}	21/2652		{Through-implantation}
21/2251		{Diffusion into or out of group IV semiconductors}	21/26526		{Recoil-implantation}
NOTE			21/26533		{of electrically inactive species in silicon to make buried insulating layers}
		{In groups H01L 21/254 - H01L 21/257 one should consider the main compositional parts of the applied layer just before the diffusion step}	21/2654		{in $A_{III}B_V$ compounds}
21/2252		{using predeposition of impurities into the semiconductor surface, e.g. from a gaseous phase}	21/26546		{of electrically active species}
21/2253		{by ion implantation}	21/26553		{Through-implantation}
21/2254		{from or through or into an applied layer, e.g. photoresist, nitrides}	21/2656		{characterised by the implantation of both electrically active and inactive species in the same semiconductor region to be doped}
21/2255		{the applied layer comprising oxides only, e.g. P_2O_5 , PSG, H_3BO_3 , doped oxides}	21/26566		{of a cluster, e.g. using a gas cluster ion beam}
21/2256		{through the applied layer}	2021/26573		{in diamond}
21/2257		{the applied layer being silicon or silicide or SIPOS, e.g. polysilicon, porous silicon}	21/2658		{of a molecular ion, e.g. decaborane}
21/2258		{Diffusion into or out of $A_{III}B_V$ compounds}	21/26586		{characterised by the angle between the ion beam and the crystal planes or the main crystal surface}
21/228		using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion processes {(H01L 21/221 - H01L 21/222 take precedence)}	21/26593		{at a temperature lower than room temperature}
21/24		Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body {(H01L 21/182 takes precedence)}	21/266		using masks {(H01L 21/26586 takes precedence)}
21/242		{Alloying of doping materials with $A_{III}B_V$ compounds}	21/268		using electromagnetic radiation, e.g. laser radiation
21/244		{Alloying of electrode materials}	21/2683		{using X-ray lasers}
21/246		{with $A_{III}B_V$ compounds}	21/2686		{using incoherent radiation}
21/248		{Apparatus specially adapted for the alloying}	21/28		Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20 - H01L 21/268
			21/28008		{Making conductor-insulator-semiconductor electrodes}
			21/28017		{the insulator being formed after the semiconductor body, the semiconductor being silicon}
			NOTE		
					{This group covers deposition of the insulators, including epitaxial insulators, and the conductors within the same process or chamber.}
			21/28026		{characterised by the conductor (H01L 21/28176 takes precedence)}
			NOTE		
					{When the final conductor comprises a superconductor, subject matter is not classified according to the subgroups H01L 21/28035 - H01L 21/28097 .

H01L

H01L 21/28026

(continued)

	Instead, it is classified in H01L 21/28026 }	21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects}
21/28035	{the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)}	21/28132 {conducting part of electrode is defined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating}
	NOTE {A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator.}	21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating}
21/28044	{the conductor comprising at least another non-silicon conductive layer}	21/2815 {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, plating}
21/28052	{the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation H01L 21/28044)}	21/28158 {Making the insulator}
		21/28167 {on single crystalline silicon, e.g. using a liquid, i.e. chemical oxidation}
21/28061	{the conductor comprising a metal or metal silicide formed by deposition, e.g. sputter deposition, i.e. without a silicidation reaction (H01L 21/28052 takes precedence)}	21/28176 {with a treatment, e.g. annealing, after the formation of the definitive gate conductor}
	NOTE {To assess the coverage of groups H01L 21/28052 and H01L 21/28061 , barrier layers, e.g. TaSiN, are not considered. }	21/28185 {with a treatment, e.g. annealing, after the formation of the gate insulator and before the formation of the definitive gate conductor}
		21/28194 {by deposition, e.g. evaporation, ALD, CVD, sputtering, laser deposition (H01L 21/28202 takes precedence)}
21/2807	{the final conductor layer next to the insulator being Si or Ge or C and their alloys except Si}	21/28202 {in a nitrogen-containing ambient, e.g. nitride deposition, growth, oxynitridation, NH ₃ nitridation, N ₂ O oxidation, thermal nitridation, RTN, plasma nitridation, RPN}
21/28079	{the final conductor layer next to the insulator being a single metal, e.g. Ta, W, Mo, Al}	21/28211 {in a gaseous ambient using an oxygen or a water vapour, e.g. RTO, possibly through a layer (H01L 21/28194 and H01L 21/28202 take precedence)}
21/28088	{the final conductor layer next to the insulator being a composite, e.g. TiN}	NOTE {Thin oxidation layers used as a barrier layer or as a buffer layer, e.g. before the formation of a high-k insulator, are classified here only if important <u>per se</u> .}
21/28097	{the final conductor layer next to the insulator being a metallic silicide}	
21/28105	{the final conductor next to the insulator having a lateral composition or doping variation, or being formed laterally by more than one deposition step}	
21/28114	{characterised by the sectional shape, e.g. T, inverted-T}	21/2822 {with substrate doping, e.g. N, Ge, C implantation, before formation of the insulator}
	NOTE {Documents are also classified in groups H01L 21/28035 - H01L 21/2810 when the composition is also relevant.}	21/28229 {by deposition of a layer, e.g. metal, metal compound or polysilicon, followed by transformation thereof into an insulating layer}
		21/28238 {with sacrificial oxide}

21/28247		{passivation or protection of the electrode, e.g. using re-oxidation}	21/302		to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting
21/28255		{the insulator being formed after the semiconductor body, the semiconductor belonging to Group IV and not being elemental silicon, e.g. Ge, SiGe, SiGeC}	21/304		Mechanical treatment, e.g. grinding, polishing, cutting {(H01L 21/30625 takes precedence)}
21/28264		{the insulator being formed after the semiconductor body, the semiconductor being a III-V compound}	21/3043		{Making grooves, e.g. cutting}
21/283		Deposition of conductive or insulating materials for electrodes {conducting electric current}	21/3046		{using blasting, e.g. sand-blasting (H01L 21/2633 takes precedence)}
21/285		from a gas or vapour, e.g. condensation	21/306		Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/31)
21/28506		{of conductive layers}	21/30604		{Chemical etching}
21/28512		{on semiconductor bodies comprising elements of Group IV of the Periodic Table}	21/30608		{Anisotropic liquid etching (H01L 21/3063 takes precedence)}
21/28518		{the conductive layers comprising silicides (H01L 21/28537 takes precedence)}	21/30612		{Etching of A _{III} B _V compounds}
21/28525		{the conductive layers comprising semiconducting material (H01L 21/28518, H01L 21/28537 take precedence)}	21/30617		{Anisotropic liquid etching}
21/28531		{Making of side-wall contacts}	21/30621		{Vapour phase etching}
21/28537		{Deposition of Schottky electrodes}	21/30625		{With simultaneous mechanical treatment, e.g. mechanico-chemical polishing}
21/2855		{by physical means, e.g. sputtering, evaporation (H01L 21/28518 - H01L 21/28537 and H01L 21/28568 take precedence)}	21/3063		Electrolytic etching
21/28556		{by chemical means, e.g. CVD, LPCVD, PECVD, laser CVD (H01L 21/28518 - H01L 21/28537 and H01L 21/28568 take precedence)}	21/30635		{of A _{III} B _V compounds}
21/28562		{Selective deposition}	21/3065		Plasma etching; Reactive-ion etching
21/28568		{the conductive layers comprising transition metals (H01L 21/28518 takes precedence)}	21/30655		{comprising alternated and repeated etching and passivation steps, e.g. Bosch process}
21/28575		{on semiconductor bodies comprising A _{III} B _V compounds}	21/308		using masks (H01L 21/3063, H01L 21/3065 take precedence)
21/28581		{Deposition of Schottky electrodes}	21/3081		{characterised by their composition, e.g. multilayer masks, materials}
21/28587		{characterised by the sectional shape, e.g. T, inverted T}	21/3083		{characterised by their size, orientation, disposition, behaviour, shape, in horizontal or vertical plane}
21/28593		{asymmetrical sectional shape}	21/3085		{characterised by their behaviour during the process, e.g. soluble masks, redeposited masks}
21/288		from a liquid, e.g. electrolytic deposition	21/3086		{characterised by the process involved to create the mask, e.g. lift-off masks, sidewalls, or to modify the mask, e.g. pre-treatment, post-treatment}
21/2885		{using an external electrical current, i.e. electro-deposition}	21/3088		{Process specially adapted to improve the resolution of the mask}
21/30		Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20 - H01L 21/26 (manufacture of electrodes thereon H01L 21/28)	21/31		to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers H01L 21/56); After treatment of these layers; Selection of materials for these layers
21/3003		{Hydrogenation or deuterisation, e.g. using atomic hydrogen from a plasma}	21/3105		After-treatment
21/3006		{of A _{III} B _V compounds}	21/31051		{Planarisation of the insulating layers (H01L 21/31058 takes precedence)}
			21/31053		{involving a dielectric removal step}
			21/31055		{the removal being a chemical etching step, e.g. dry etching (etching per se H01L 21/311)}

21/31056		{the removal being a selective chemical etching step, e.g. selective dry etching through a mask}
21/31058		{of organic layers}
21/311		Etching the insulating layers {by chemical or physical means (H01L 21/31058 takes precedence)}
21/31105		{Etching inorganic layers}
21/31111		{by chemical means}
21/31116		{by dry-etching}
21/31122		{of layers not containing Si, e.g. PZT, Al ₂ O ₃ }
21/31127		{Etching organic layers}
21/31133		{by chemical means}
21/31138		{by dry-etching}
21/31144		{using masks}
21/3115		Doping the insulating layers
21/31155		{by ion implantation}
21/312		Organic layers, e.g. photoresist (H01L 21/3105 , H01L 21/32 take precedence; {photoresists per se G03C })

WARNING

Groups [H01L 21/312](#) – [H01L 21/3128](#) are no longer used for the classification of documents as of May 1, 2011. The content of these groups is being reclassified into groups [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

21/3121		{Layers comprising organo-silicon compounds} (Frozen)
21/3122		{layers comprising polysiloxane compounds} (Frozen)
21/3124		{layers comprising hydrogen silsesquioxane} (Frozen)
21/3125		{layers comprising silazane compounds} (Frozen)
21/3127		{Layers comprising fluoro (hydro)carbon compounds, e.g. polytetrafluoroethylene} (Frozen)
21/3128		{by Langmuir-Blodgett techniques} (Frozen)
21/314		Inorganic layers (H01L 21/3105 , H01L 21/32 take precedence)

WARNING

Groups [H01L 21/314](#) – [H01L 21/3185](#) are no longer used for the classification of documents as of May 1, 2011. The content of these group is being reclassified into group [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

21/3141		{Deposition using atomic layer deposition techniques [ALD]} (Frozen)
21/3142		{of nano-laminates, e.g. alternating layers of Al ₂ O ₃ -HfO ₂ } (Frozen)
21/3143		{composed of alternated layers or of mixtures of nitrides and oxides or of oxinitrides, e.g. formation of oxinitride by oxidation of nitride layers} (Frozen)
21/3144		{on silicon} (Frozen)
21/3145		{formed by deposition from a gas or vapour} (Frozen)
21/3146		{Carbon layers, e.g. diamond-like layers} (Frozen)
21/3147		{Epitaxial deposition of insulating materials} (Frozen)
21/3148		{Silicon Carbide layers} (Frozen)
2021/3149		{Langmuir-Blodgett techniques} (Frozen)
21/316		composed of oxides or glassy oxides or oxide based glass (Frozen)

WARNING

Group [H01L 21/316](#) is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

21/31604		{Deposition from a gas or vapour (H01L 21/31691 , H01L 21/31695 take precedence)} (Frozen)
21/31608		{Deposition of SiO ₂ (H01L 21/31625 , H01L 21/31629 and H01L 21/31633 take precedence)} (Frozen)
21/31612		{on a silicon body} (Frozen)
21/31616		{Deposition of Al ₂ O ₃ } (Frozen)
21/3162		{on a silicon body} (Frozen)
21/31625		{Deposition of boron or phosphorus doped silicon oxide, e.g. BSG, PSG, BPSG} (Frozen)
21/31629		{Deposition of halogen doped silicon oxide, e.g. fluorine doped silicon oxide} (Frozen)
21/31633		{Deposition of carbon doped silicon oxide, e.g. SiOC} (Frozen)
21/31637		{Deposition of Tantalum oxides, e.g. Ta ₂ O ₅ } (Frozen)
21/31641		{Deposition of Zirconium oxides, e.g. ZrO ₂ } (Frozen)
21/31645		{Deposition of Hafnium oxides, e.g. HfO ₂ } (Frozen)

21/3165 {formed by oxidation
(Frozen) [\(H01L 21/31691, H01L 21/31695 take precedence\)](#)}

21/31654 {of semiconductor materials, e.g.
(Frozen) the body itself}

21/31658 {by thermal oxidation, e.g. of
(Frozen) SiGe}

21/31662 {of silicon in uncombined
(Frozen) form}

21/31666 {of AIII BV compounds}
(Frozen)

21/3167 {of anodic oxidation}
(Frozen)

21/31675 {of silicon}
(Frozen)

21/31679 {of AIII BV compounds}
(Frozen)

21/31683 {of metallic layers, e.g. Al
(Frozen) deposited on the body, e.g.
formation of multi-layer
insulating structures}

21/31687 {by anodic oxidation}
(Frozen)

21/31691 {with perovskite structure}
(Frozen)

21/31695 {Deposition of porous oxides or
(Frozen) porous glassy oxides or oxide based
porous glass}

21/318 composed of nitrides
(Frozen)

WARNING

Group [H01L 21/318](#) is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

21/3185 {of siliconnitrides}
(Frozen)

21/32 using masks

21/3205 Deposition of non-insulating-, e.g.
conductive- or resistive-, layers on
insulating layers; After-treatment of
these layers ([manufacture of electrodes](#)
[H01L 21/28](#))

21/32051 {Deposition of metallic or metal-
silicide layers}

21/32053 {of metal-silicide layers}

21/32055 {Deposition of semiconductive layers,
e.g. poly - or amorphous silicon
layers}

21/32056 {Deposition of conductive or
semi-conductive organic layers
([H01L 21/32058 takes precedence](#))}

21/32058 {Deposition of superconductive
layers}

21/321 After treatment

21/32105 {Oxidation of silicon-containing
layers}

21/3211 {Nitridation of silicon-containing
layers}

21/32115 {Planarisation}

21/3212 {by chemical mechanical
polishing [CMP]}

21/32125 {by simultaneously passing
an electrical current, i.e.
electrochemical mechanical
polishing, e.g. ECMP}

21/3213 Physical or chemical etching
of the layers, e.g. to produce
a patterned layer from a pre-
deposited extensive layer

21/32131 {by physical means only}

21/32132 {of silicon-containing layers}

21/32133 {by chemical means only}

21/32134 {by liquid etching only}

21/32135 {by vapour etching only}

21/32136 {using plasmas}

21/32137 {of silicon-containing
layers}

21/32138 {pre- or post-treatments, e.g.
anti-corrosion processes}

21/32139 {using masks}

21/3215 Doping the layers

21/32155 {Doping polycrystalline - or
amorphous silicon layers}

21/322 to modify their internal properties, e.g. to
produce internal imperfections

21/3221 {of silicon bodies, e.g. for gettering}

21/3223 {using cavities formed by hydrogen
or noble gas ion implantation}

21/3225 {Thermally inducing defects using
oxygen present in the silicon body
for intrinsic gettering ([H01L 21/3226](#)
[takes precedence](#))}

NOTE

{Gettering using both extrinsic and intrinsic gettering techniques is classified in both [H01L 21/3221](#) and [H01L 21/3225](#).}

21/3226 {of silicon on insulator}

21/3228 {of A_{III}B_V compounds, e.g. to make
them semi-insulating}

21/324 Thermal treatment for modifying
the properties of semiconductor
bodies, e.g. annealing, sintering
([H01L 21/20](#) - [H01L 21/288](#) and
[H01L 21/302](#) - [H01L 21/322 take precedence](#))

21/3242 {for the formation of PN junctions
without addition of impurities
([H01L 21/22 takes precedence](#))}

21/3245 {of A_{III}B_V compounds}

21/3247	 {for altering the shape, e.g. smoothing the surface}	21/465	 Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/469)
	WARNING	21/467	 using masks
	Group H01L 21/3247 is incomplete pending reclassification of documents from group H01L 21/324 .	21/469	 to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers H01L 21/56); After-treatment of these layers
	Groups H01L 21/324 and H01L 21/3247 should be considered in order to perform a complete search.	21/47	 Organic layers, e.g. photoresist (H01L 21/475 , H01L 21/4757 take precedence)
21/326	 Application of electric currents or fields, e.g. for electroforming (H01L 21/20 - H01L 21/288 and H01L 21/302 - H01L 21/324 take precedence)	21/471	 Inorganic layers (H01L 21/475 , H01L 21/4757 take precedence)
21/34	. . . the devices having semiconductor bodies not provided for in groups H01L 21/18 , H10D 48/04 and H10D 48/07 , with or without impurities, e.g. doping materials	21/473	 composed of oxides or glassy oxides or oxide based glass
21/38	 Diffusion of impurity materials, e.g. doping materials, electrode materials, into or out of a semiconductor body, or between semiconductor regions	21/475	 using masks
21/383	 using diffusion into or out of a solid from or into a gaseous phase	21/4757	 After-treatment
21/385	 using diffusion into or out of a solid from or into a solid phase, e.g. a doped oxide layer	21/47573	 {Etching the layer}
21/388	 using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion processes	21/47576	 {Doping the layer}
21/40	 Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body	21/4763	 Deposition of non-insulating, e.g. conductive -, resistive -, layers on insulating layers; After-treatment of these layers (manufacture of electrodes H01L 21/28 , H01L 21/44)
21/42	 Bombardment with radiation	21/47635	 {After-treatment of these layers}
21/423	 with high-energy radiation	21/477	 Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/38 - H01L 21/449 and H01L 21/461 - H01L 21/475 take precedence)
21/425	 producing ion implantation	21/479	 Application of electric currents or fields, e.g. for electroforming (H01L 21/38 - H01L 21/449 and H01L 21/461 - H01L 21/475 take precedence)
21/426	 using masks	21/48	 Manufacture or treatment of parts, e.g. containers, prior to assembly of the devices, using processes not provided for in a single one of the groups H01L 21/18 - H01L 21/326 or H10D 48/04 - H10D 48/07
21/428	 using electromagnetic radiation, e.g. laser radiation		NOTE
21/44	 Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/38 - H01L 21/428		{In this group, the expression "treatment" covers also the removal of leads from parts.}
21/441	 Deposition of conductive or insulating materials for electrodes	21/4803	 {Insulating or insulated parts, e.g. mountings, containers, diamond heatsinks (H01L 21/4846 takes precedence; printed circuit boards H05K 1/00)}
21/443	 from a gas or vapour, e.g. condensation	21/4807	 {Ceramic parts}
21/445	 from a liquid, e.g. electrolytic deposition	21/481	 {Insulating layers on insulating parts, with or without metallisation}
21/447	 involving the application of pressure, e.g. thermo-compression bonding	21/4814	 {Conductive parts}
21/449	 involving the application of mechanical vibrations, e.g. ultrasonic vibrations	21/4817	 {for containers, e.g. caps (H01L 21/4871 takes precedence)}
21/46	 Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/428 (manufacture of electrodes thereon H01L 21/44)	21/4821	 {Flat leads, e.g. lead frames with or without insulating supports}
21/461	 to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting	21/4825	 {Connection or disconnection of other leads to or from flat leads, e.g. wires, bumps, other flat leads}
21/463	 Mechanical treatment, e.g. grinding, ultrasonic treatment	21/4828	 {Etching (etching for cleaning without patterning H01L 21/4835)}

21/4832		{Etching a temporary substrate after encapsulation process to form leads}	21/563		{Encapsulation of active face of flip-chip device, e.g. underfilling or underencapsulation of flip-chip, encapsulation preform on chip or mounting substrate}
21/4835		{Cleaning, e.g. removing of solder}	21/565		{Moulds}
21/4839		{Assembly of a flat lead with an insulating support, e.g. for TAB}	21/566		{Release layers for moulds, e.g. release layers, layers against residue during moulding}
21/4842		{Mechanical treatment, e.g. punching, cutting, deforming, cold welding}	21/568		{Temporary substrate used as encapsulation process aid (H01L 21/4832 and H01L 21/566 take precedence)}
21/4846		{Leads on or in insulating or insulated substrates, e.g. metallisation (H01L 21/4821 takes precedence; metallisation of ceramics in general C04B 41/51 ; printed circuits H05K 3/00)}	21/60		Attaching {or detaching} leads or other conductive members, to be used for carrying current to or from the device in operation
21/485		{Adaptation of interconnections, e.g. engineering charges, repair techniques}	2021/60007		{involving a soldering or an alloying process}
21/4853		{Connection or disconnection of other leads to or from a metallisation, e.g. pins, wires, bumps}	2021/60015		{using plate connectors, e.g. layer, film}
21/4857		{Multilayer substrates (multilayer metallisation on monolayer substrate H01L 21/4846)}	2021/60022		{using bump connectors, e.g. for flip chip mounting}
21/486		{Via connections through the substrate with or without pins}	2021/6003		{Apparatus therefor}
21/4864		{Cleaning, e.g. removing of solder}	2021/60037		{Right-up bonding}
21/4867		{Applying pastes or inks, e.g. screen printing (H01L 21/486 takes precedence)}	2021/60045		{Pre-treatment step of the bump connectors prior to bonding}
21/4871		{Bases, plates or heatsinks}	2021/60052		{Oxide removing step, e.g. flux, rosin}
21/4875		{Connection or disconnection of other leads to or from bases or plates}	2021/6006		{with temporary supporting member not part of an apparatus, e.g. removable coating, film or substrate}
21/4878		{Mechanical treatment, e.g. deforming}	2021/60067		{Aligning the bump connectors with the mounting substrate}
21/4882		{Assembly of heatsink parts}	2021/60075		{involving active alignment, i.e. by apparatus steering, e.g. using alignment marks, sensors}
21/4885		{Wire-like parts or pins (wire ball formation B23K 20/00 ; methods related to connecting semiconductor or other solid state bodies H01L 24/00)}	2021/60082		{involving passive alignment, e.g. using surface energy, chemical reactions, thermal equilibrium}
21/4889		{Connection or disconnection of other leads to or from wire-like parts, e.g. wires}	2021/6009		{involving guiding structures, e.g. structures that are left at least partly in the bonded product, spacers}
21/4892		{Cleaning}	2021/60097		{Applying energy, e.g. for the soldering or alloying process}
21/4896		{Mechanical treatment, e.g. cutting, bending}	2021/60105		{using electromagnetic radiation}
21/50		Assembly of semiconductor devices using processes or apparatus not provided for in a single one of the groups H01L 21/18 - H01L 21/326 or H10D 48/04 - H10D 48/07 {e.g. sealing of a cap to a base of a container}	2021/60112		{Coherent radiation, i.e. laser beam}
NOTE			2021/6012		{Incoherent radiation, e.g. polychromatic heating lamp}
{Arrangements for connecting or disconnecting semiconductor or other solid state bodies, or methods related thereto, other than those arrangements or methods covered by the following subgroups, are covered by H01L 24/00 .}			2021/60127		{Induction heating, i.e. eddy currents}
21/52		Mounting semiconductor bodies in containers	2021/60135		{using convection, e.g. reflow oven}
21/54		Providing fillings in containers, e.g. gas fillings	2021/60142		{with a graded temperature profile}
21/56		Encapsulations, e.g. encapsulation layers, coatings	2021/6015		{using conduction, e.g. chuck heater, thermocompression}
21/561		{Batch processing}	2021/60157		{with a graded temperature profile}
			2021/60165		{using an electron beam}
			2021/60172		{using static pressure}
			2021/6018		{Unidirectional static pressure}
			2021/60187		{Isostatic pressure, e.g. degassing using vacuum or pressurised liquid}

2021/60195		{using dynamic pressure, e.g. ultrasonic or thermosonic bonding}	21/67005	. .	{Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00 ; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)}
2021/60202		{using a protective atmosphere, e.g. with forming or shielding gas}	21/67011	. . .	{Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46 ; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)}
2021/6021		{using an autocatalytic reaction}	21/67017		{Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)}
2021/60217		{Detaching bump connectors, e.g. after testing}	21/67023		{for general liquid treatment, e.g. etching followed by cleaning}
2021/60225		{Arrangement of bump connectors prior to mounting}	21/67028		{for cleaning followed by drying, rinsing, stripping, blasting or the like}
2021/60232		{wherein the bump connectors are disposed only on the semiconductor chip}	21/67034		{for drying}
2021/6024		{wherein the bump connectors are disposed only on the mounting substrate}	21/6704		{for wet cleaning or washing}
2021/60247		{wherein the bump connectors are disposed on both the semiconductor chip and the mounting substrate, e.g. bump to bump}	21/67046		{using mainly scrubbing means, e.g. brushes}
2021/60255		{wherein the bump connectors are provided as prepeg, e.g. are provided in an insulating plate member}	21/67051		{using mainly spraying means, e.g. nozzles}
2021/60262		{Lateral distribution of bump connectors prior to mounting}	21/67057		{with the semiconductor substrates being dipped in baths or vessels}
2021/6027		{Mounting on semiconductor conductive members}	21/67063		{for etching}
2021/60277		{involving the use of conductive adhesives}	21/67069		{for drying etching}
2021/60285		{involving the use of mechanical auxiliary parts without the use of an alloying or soldering process, e.g. pressure contacts}	21/67075		{for wet etching}
2021/60292		{involving the use of an electron or laser beam}	21/6708		{using mainly spraying means, e.g. nozzles}
21/603		involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence)	21/67086		{with the semiconductor substrates being dipped in baths or vessels}
21/607		involving the application of mechanical vibrations, e.g. ultrasonic vibrations	21/67092		{Apparatus for mechanical treatment (or grinding or cutting, see the relevant groups in subclasses B24B or B28D)}
21/62	. .	the devices having no potential barriers	21/67098		{Apparatus for thermal treatment}
21/64	. .	Manufacture or treatment of solid state devices other than semiconductor devices, or of parts thereof, not peculiar to a single device provided for in subclasses H10E, H10H, H10K or H10N	21/67103		{mainly by conduction}
21/67	. .	Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus specially adapted for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components {; Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00 ; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302 ; apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies and for methods related thereto H01L 24/74 ;)}	21/67109		{mainly by convection}
			21/67115		{mainly by radiation}
			21/67121		{Apparatus for making assemblies not otherwise provided for, e.g. package constructions}
			21/67126		{Apparatus for sealing, encapsulating, glassing, decapsulating or the like (processes H01L 23/02, H01L 23/28)}
			21/67132		{Apparatus for placing on an insulating substrate, e.g. tape}
			21/67138		{Apparatus for wiring semiconductor or solid state device}
			21/67144		{Apparatus for mounting on conductive members, e.g. leadframes or conductors on insulating substrates}
			21/6715		{Apparatus for applying a liquid, a resin, an ink or the like (H01L 21/67126 takes precedence)}
			21/67155		{Apparatus for manufacturing or treating in a plurality of work-stations}
			21/67161		{characterized by the layout of the process chambers}
			21/67167		{surrounding a central transfer chamber}
			21/67173		{in-line arrangement}
			21/67178		{vertical arrangement}

NOTE

{In this subgroup the term substrate designates a semiconductor or electric solid state device or component, or a wafer.}

21/67184		{characterized by the presence of more than one transfer chamber}	21/6732	. . .	{Vertical carrier comprising wall type elements whereby the substrates are horizontally supported, e.g. comprising sidewalls}
21/6719		{characterized by the construction of the processing chambers, e.g. modular processing chambers}	21/67323		{characterized by a material, a roughness, a coating or the like}
21/67196		{characterized by the construction of the transfer chamber}	21/67326	. . .	{Horizontal carrier comprising wall type elements whereby the substrates are vertically supported, e.g. comprising sidewalls}
21/67201		{characterized by the construction of the load-lock chamber}	21/6733		{characterized by a material, a roughness, a coating or the like}
21/67207		{comprising a chamber adapted to a particular process}	21/67333	. . .	{Trays for chips (magazine for components H05K 13/0084)}
21/67213		{comprising at least one ion or electron beam chamber (coating by ion implantation C23C ; ion or electron beam tubes H01J 37/00)}	21/67336		{characterized by a material, a roughness, a coating or the like}
21/67219		{comprising at least one polishing chamber (polishing apparatuses B24B)}	21/6734	. . .	{specially adapted for supporting large square shaped substrates (containers and packaging elements for glass sheets B65D 85/48 , transporting of glass products during their manufacture C03B 35/00)}
21/67225		{comprising at least one lithography chamber (lithographic apparatuses G03F 7/00)}	21/67343		{characterized by a material, a roughness, a coating or the like}
21/6723		{comprising at least one plating chamber (electroless plating apparatuses C23C , electroplating apparatuses C25D)}	21/67346	. . .	{characterized by being specially adapted for supporting a single substrate or by comprising a stack of such individual supports}
21/67236		{the substrates being processed being not semiconductor wafers, e.g. leadframes or chips}	21/6735	. . .	{Closed carriers}
21/67242	. . .	{Apparatus for monitoring, sorting or marking (testing or measuring during manufacture H01L 22/00 , marks per se H01L 23/544 ; testing individual semiconductor devices G01R 31/26)}	21/67353		{specially adapted for a single substrate}
21/67248		{Temperature monitoring}	21/67356		{specially adapted for containing chips, dies or ICs}
21/67253		{Process monitoring, e.g. flow or thickness monitoring}	21/67359		{specially adapted for containing masks, reticles or pellicles}
21/67259		{Position monitoring, e.g. misposition detection or presence detection}	21/67363		{specially adapted for containing substrates other than wafers (H01L 21/67356 , H01L 21/67359 take precedence)}
21/67265		{of substrates stored in a container, a magazine, a carrier, a boat or the like}	21/67366		{characterised by materials, roughness, coatings or the like (materials relating to an injection moulding process B29C 45/00 ; chemical composition of materials C08L 51/00)}
21/67271		{Sorting devices}	21/67369		{characterised by shock absorbing elements, e.g. retainers or cushions}
21/67276		{Production flow monitoring, e.g. for increasing throughput (program-control systems per se G05B 19/00 , e.g. total factory control G05B 19/418)}	21/67373		{characterised by locking systems}
21/67282		{Marking devices}	21/67376		{characterised by sealing arrangements}
21/67288		{Monitoring of warpage, curvature, damage, defects or the like}	21/67379		{characterised by coupling elements, kinematic members, handles or elements to be externally gripped}
21/67294		{using identification means, e.g. labels on substrates or labels on containers}	21/67383		{characterised by substrate supports}
21/673	. .	using specially adapted carriers {or holders; Fixing the workpieces on such carriers or holders (holders for supporting a complete device in operation H01L 23/32) }	21/67386		{characterised by the construction of the closed carrier}
21/67303	. . .	{Vertical boat type carrier whereby the substrates are horizontally supported, e.g. comprising rod-shaped elements}	21/67389		{characterised by atmosphere control}
21/67306		{characterized by a material, a roughness, a coating or the like}	21/67393		{characterised by the presence of atmosphere modifying elements inside or attached to the closed carrier}
21/67309		{characterized by the substrate support}	21/67396		{characterised by the presence of antistatic elements}
21/67313	. . .	{Horizontal boat type carrier whereby the substrates are vertically supported, e.g. comprising rod-shaped elements}	21/677	. .	for conveying, e.g. between different workstations
21/67316		{characterized by a material, a roughness, a coating or the like}	21/67703	. . .	{between different workstations}
			21/67706		{Mechanical details, e.g. roller, belt (H01L 21/67709 takes precedence)}
			21/67709		{using magnetic elements}
			21/67712		{the substrate being handled substantially vertically}
			21/67715		{Changing the direction of the conveying path}

- 21/67718 {Changing orientation of the substrate, e.g. from a horizontal position to a vertical position}
- 21/67721 {the substrates to be conveyed not being semiconductor wafers or large planar substrates, e.g. chips, lead frames ([H01L 21/6773 takes precedence](#))}
- 21/67724 {by means of a cart or a vehicule}
- 21/67727 {using a general scheme of a conveying path within a factory}
- 21/6773 {Conveying cassettes, containers or carriers}
- 21/67733 {Overhead conveying}
- 21/67736 {Loading to or unloading from a conveyor}
- 21/67739 . . . {into and out of processing chamber}
- 21/67742 {Mechanical parts of transfer devices ([robots in general in B25J](#))}
- 21/67745 {characterized by movements or sequence of movements of transfer devices}
- 21/67748 {horizontal transfer of a single workpiece}
- 21/67751 {vertical transfer of a single workpiece}
- 21/67754 {horizontal transfer of a batch of workpieces}
- 21/67757 {vertical transfer of a batch of workpieces}
- 21/6776 {Continuous loading and unloading into and out of a processing chamber, e.g. transporting belts within processing chambers}
- 21/67763 . . . {the wafers being stored in a carrier, involving loading and unloading ([H01L 21/6779 takes precedence](#))}
- 21/67766 {Mechanical parts of transfer devices ([robots in general in B25J](#))}
- 21/67769 {Storage means}
- 21/67772 {involving removal of lid, door, cover}
- 21/67775 {Docking arrangements}
- 21/67778 {involving loading and unloading of wafers}
- 21/67781 {Batch transfer of wafers}
- 21/67784 . . . {using air tracks}
- 21/67787 {with angular orientation of the workpieces}
- 21/6779 {the workpieces being stored in a carrier, involving loading and unloading}
- 21/67793 . . . {with orientating and positioning by means of a vibratory bowl or track}
- 21/67796 . . . {with angular orientation of workpieces ([H01L 21/67787](#) and [H01L 21/67793 take precedence](#))}
- 21/68 . . for positioning, orientation or alignment
- 21/681 . . . {using optical controlling means}
- 21/682 . . . {Mask-wafer alignment ([in general G03F 7/70, G03F 9/70](#))}
- 21/683 . . for supporting or gripping ([for conveying H01L 21/677, for positioning, orientation or alignment H01L 21/68](#))
- 21/6831 . . . {using electrostatic chucks}
- 21/6833 {Details of electrostatic chucks}
- 21/6835 . . . {using temporarily an auxiliary support}
- NOTE**
- {[H01L 21/6835](#), details of the apparatus are to be further indexed using the indexing codes chosen from [H01L 2221/68304](#) and subgroups.}
- 21/6836 {Wafer tapes, e.g. grinding or dicing support tapes ([adhesive tapes in general C09J 7/20](#))}
- 21/6838 . . . {with gripping and holding devices using a vacuum; Bernoulli devices}
- 21/687 . . . using mechanical means, e.g. chucks, clamps or pinches ([using electrostatic chucks H01L 21/6831](#))}
- 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance}
- 21/68714 {the wafers being placed on a susceptor, stage or support}
- 21/68721 {characterised by edge clamping, e.g. clamping ring}
- 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers}
- 21/68735 {characterised by edge profile or support profile}
- 21/68742 {characterised by a lifting arrangement, e.g. lift pins}
- 21/6875 {characterised by a plurality of individual support members, e.g. support posts or protrusions}
- 21/68757 {characterised by a coating or a hardness or a material}
- 21/68764 {characterised by a movable susceptor, stage or support, others than those only rotating on their own vertical axis, e.g. susceptors on a rotating carousel}
- 21/68771 {characterised by supporting more than one semiconductor substrate}
- 21/68778 {characterised by supporting substrates others than wafers, e.g. chips}
- 21/68785 {characterised by the mechanical construction of the susceptor, stage or support}
- 21/68792 {characterised by the construction of the shaft}
- 21/70 . Manufacture or treatment of devices consisting of a plurality of solid state components formed in or on a common substrate or of parts thereof; Manufacture of integrated circuit devices or of parts thereof ([multistep manufacturing processes of assemblies consisting of a plurality of individual semiconductor or other solid state devices H01L 25/00; manufacture of assemblies consisting of preformed electrical components H05K 3/00, H05K 13/00](#))
- 21/702 . . {of thick-or thin-film circuits or parts thereof}
- 21/705 . . . {of thick-film circuits or parts thereof}
- 21/707 . . . {of thin-film circuits or parts thereof}
- 21/71 . . Manufacture of specific parts of devices defined in group [H01L 21/70](#) ([H01L 21/0405, H01L 21/0445](#)), [H01L 21/28, H01L 21/44, H01L 21/48 take precedence](#))
- 21/74 . . . Making of {localized} buried regions, e.g. buried collector layers, internal connections {substrate contacts}
- 21/743 {Making of internal connections, substrate contacts}
- 21/746 {for AIII-BV integrated circuits}
- 21/76 . . . Making of isolation regions between components
- 21/7602 {between components manufactured in an active substrate comprising SiC compounds}

21/7605		{between components manufactured in an active substrate comprising AIII BV compounds}	21/76237		{introducing impurities in trench side or bottom walls, e.g. for forming channel stoppers or alter isolation behavior}
21/7607		{between components manufactured in an active substrate comprising A _{II} B _{VI} compounds}	21/7624		{using semiconductor on insulator [SOI] technology}
21/761		PN junctions	21/76243		{using silicon implanted buried insulating layers, e.g. oxide layers, i.e. SIMOX techniques}
21/762		Dielectric regions {, e.g. EPIC dielectric isolation, LOCOS; Trench refilling techniques, SOI technology, use of channel stoppers}	21/76245		{using full isolation by porous oxide silicon, i.e. FIPOS techniques}
21/76202		{using a local oxidation of silicon, e.g. LOCOS, SWAMI, SILO (H01L 21/76235 takes precedence; together with vertical isolation, e.g. LOCOS in a SOI substrate, H01L 21/76264)}	21/76248		{using lateral overgrowth techniques, i.e. ELO techniques}
21/76205		{in a region being recessed from the surface, e.g. in a recess, groove, tub or trench region}	21/76251		{using bonding techniques}
21/76208		{using auxiliary pillars in the recessed region, e.g. to form LOCOS over extended areas}	21/76254		{with separation/delamination along an ion implanted layer, e.g. Smart-cut, Unibond}
21/7621		{the recessed region having a shape other than rectangular, e.g. rounded or oblique shape (H01L 21/76208 takes precedence)}	21/76256		{using silicon etch back techniques, e.g. BESOI, ELTRAN}
21/76213		{introducing electrical inactive or active impurities in the local oxidation region, e.g. to alter LOCOS oxide growth characteristics or for additional isolation purpose}	21/76259		{with separation/delamination along a porous layer}
21/76216		{introducing electrical active impurities in the local oxidation region for the sole purpose of creating channel stoppers}	21/76262		{using selective deposition of single crystal silicon, i.e. SEG techniques}
21/76218		{introducing both types of electrical active impurities in the local oxidation region for the sole purpose of creating channel stoppers, e.g. for isolation of complementary doped regions}	21/76264		{SOI together with lateral isolation, e.g. using local oxidation of silicon, or dielectric or polycrystalline material refilled trench or air gap isolation regions, e.g. completely isolated semiconductor islands}
21/76221		{with a plurality of successive local oxidation steps}	21/76267		{Vertical isolation by silicon implanted buried insulating layers, e.g. oxide layers, i.e. SIMOX techniques}
21/76224		{using trench refilling with dielectric materials (trench filling with polycrystalline silicon H01L 21/763; together with vertical isolation, e.g. trench refilling in a SOI substrate H01L 21/76264)}	21/7627		{Vertical isolation by full isolation by porous oxide silicon, i.e. FIPOS techniques}
21/76227		{the dielectric materials being obtained by full chemical transformation of non-dielectric materials, such as polycrystalline silicon, metals}	21/76272		{Vertical isolation by lateral overgrowth techniques, i.e. ELO techniques}
21/76229		{Concurrent filling of a plurality of trenches having a different trench shape or dimension, e.g. rectangular and V-shaped trenches, wide and narrow trenches, shallow and deep trenches}	21/76275		{Vertical isolation by bonding techniques}
21/76232		{of trenches having a shape other than rectangular or V-shape, e.g. rounded corners, oblique or rounded trench walls (H01L 21/76229 takes precedence)}	21/76278		{Vertical isolation by selective deposition of single crystal silicon, i.e. SEG techniques}
21/76235		{trench shape altered by a local oxidation of silicon process step, e.g. trench corner rounding by LOCOS}	21/76281		{Lateral isolation by selective oxidation of silicon}
			21/76283		{Lateral isolation by refilling of trenches with dielectric material}
			21/76286		{Lateral isolation by refilling of trenches with polycrystalline material}
			21/76289		{Lateral isolation by air gap}
			21/76291		{Lateral isolation by field effect}
			21/76294		{using selective deposition of single crystal silicon, i.e. SEG techniques}
			21/76297		{Dielectric isolation using EPIC techniques, i.e. epitaxial passivated integrated circuit}
			21/763		Polycrystalline semiconductor regions {(H01L 21/76264 takes precedence)}
			21/764		Air gaps {(H01L 21/76264 takes precedence)}
			21/765		by field effect {(H01L 21/76264 takes precedence)}

21/768 . . . Applying interconnections to be used for carrying current between separate components within a device {comprising conductors and dielectrics}

NOTE

{Groups
[H01L 21/768](#) - [H01L 21/76898](#) cover multi-step processes for manufacturing interconnections. Information peculiar to single-step processes should also be classified in the corresponding group, e.g.

- cleaning [H01L 21/02041](#)
- etching [H01L 21/311](#), [H01L 21/3213](#)
- masking [H01L 21/027](#), [H01L 21/033](#), [H01L 21/31144](#), [H01L 21/32139](#)
- planarizing [H01L 21/3105](#), [H01L 21/321](#) }

21/76801 {characterised by the formation and the after-treatment of the dielectrics, e.g. smoothing}
 21/76802 {by forming openings in dielectrics}
 21/76804 {by forming tapered via holes}
 21/76805 {the opening being a via or contact hole penetrating the underlying conductor}
 21/76807 {for dual damascene structures}
 21/76808 {involving intermediate temporary filling with material}
 21/7681 {involving one or more buried masks}
 21/76811 {involving multiple stacked pre-patterned masks}
 21/76813 {involving a partial via etch}
 21/76814 {post-treatment or after-treatment, e.g. cleaning or removal of oxides on underlying conductors}
 21/76816 {Aspects relating to the layout of the pattern or to the size of vias or trenches ([layout of the interconnections per se H01L 23/528](#); [CAD of ICs G06F 30/00](#))}
 21/76817 {using printing or stamping techniques}
 21/76819 {Smoothing of the dielectric ([planarisation of insulating materials per se H01L 21/31051](#))}
 21/7682 {the dielectric comprising air gaps}
 21/76822 {Modification of the material of dielectric layers, e.g. grading, after-treatment to improve the stability of the layers, to increase their density etc.}
 21/76823 {transforming an insulating layer into a conductive layer}
 21/76825 {by exposing the layer to particle radiation, e.g. ion implantation, irradiation with UV light or electrons etc. ([plasma treatment H01L 21/76826](#))}
 21/76826 {by contacting the layer with gases, liquids or plasmas}
 21/76828 {thermal treatment}
 21/76829 {characterised by the formation of thin functional dielectric layers, e.g. dielectric etch-stop, barrier, capping or liner layers}
 21/76831 {in via holes or trenches, e.g. non-conductive sidewall liners}
 21/76832 {Multiple layers}

21/76834 {formation of thin insulating films on the sidewalls or on top of conductors ([H01L 21/76831](#) takes precedence)}
 21/76835 {Combinations of two or more different dielectric layers having a low dielectric constant ([H01L 21/76832](#) takes precedence)}
 21/76837 {Filling up the space between adjacent conductive structures; Gap-filling properties of dielectrics}
 21/76838 {characterised by the formation and the after-treatment of the conductors ([etching for patterning the conductors H01L 21/3213](#))}

NOTE

{When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. [H01L 21/28026](#) }.

21/7684 {Smoothing; Planarisation}
 21/76841 {Barrier, adhesion or liner layers}
 21/76843 {formed in openings in a dielectric}
 21/76844 {Bottomless liners}
 21/76846 {Layer combinations}
 21/76847 {the layer being positioned within the main fill metal}
 21/76849 {the layer being positioned on top of the main fill metal}
 21/7685 {the layer covering a conductive structure ([H01L 21/76849](#) takes precedence)}
 21/76852 {the layer also covering the sidewalls of the conductive structure}
 21/76853 {characterized by particular after-treatment steps}
 21/76855 {After-treatment introducing at least one additional element into the layer}
 21/76856 {by treatment in plasmas or gaseous environments, e.g. nitriding a refractory metal liner}
 21/76858 {by diffusing alloying elements}
 21/76859 {by ion implantation}
 21/76861 {Post-treatment or after-treatment not introducing additional chemical elements into the layer}
 21/76862 {Bombardment with particles, e.g. treatment in noble gas plasmas; UV irradiation}
 21/76864 {Thermal treatment}
 21/76865 {Selective removal of parts of the layer ([H01L 21/76844](#) takes precedence)}
 21/76867 {characterized by methods of formation other than PVD, CVD or deposition from a liquids ([PVD H01L 21/2855](#); [CVD H01L 21/28556](#); [deposition from liquids H01L 21/288](#))}
 21/76868 {Forming or treating discontinuous thin films, e.g. repair, enhancement or reinforcement of discontinuous thin films}

21/7687		{Thin films associated with contacts of capacitors}	22/10	. {Measuring as part of the manufacturing process (burn-in G01R 31/2855)}
21/76871		{Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. seed layers}	22/12	. . {for structural parameters, e.g. thickness, line width, refractive index, temperature, warp, bond strength, defects, optical inspection, electrical measurement of structural dimensions, metallurgic measurement of diffusions (electrical measurement of diffusions H01L 22/14)}
21/76873		{for electroplating}	22/14	. . {for electrical parameters, e.g. resistance, deep-levels, CV, diffusions by electrical means}
21/76874		{for electroless plating}	22/20	. {Sequence of activities consisting of a plurality of measurements, corrections, marking or sorting steps}
21/76876		{for deposition from the gas phase, e.g. CVD}	22/22	. . {Connection or disconnection of sub-entities or redundant parts of a device in response to a measurement (testing and repair of stores after manufacture including at wafer scale G11C 29/00 ; fuses per se H01L 23/525)}
21/76877		{Filling of holes, grooves or trenches, e.g. vias, with conductive material}	22/24	. . {Optical enhancement of defects or not directly visible states, e.g. selective electrolytic deposition, bubbles in liquids, light emission, colour change (voltage contrast G01R 31/311)}
21/76879		{by selective deposition of conductive material in the vias, e.g. selective C.V.D. on semiconductor material, plating (plating on semiconductors in general H01L 21/288)}	22/26	. . {Acting in response to an ongoing measurement without interruption of processing, e.g. endpoint detection, in-situ thickness measurement (endpoint detection arrangements in CMP apparatus B24B 37/013 , in discharge apparatus H01J 37/32)}
21/7688		{by deposition over sacrificial masking layer, e.g. lift-off (lift-off per se H01L 21/0272)}	22/30	. {Structural arrangements specially adapted for testing or measuring during manufacture or treatment, or specially adapted for reliability measurements}
21/76882		{Reflowing or applying of pressure to better fill the contact hole}	22/32	. . {Additional lead-in metallisation on a device or substrate, e.g. additional pads or pad portions, lines in the scribe line, sacrificed conductors (arrangements for conducting electric current to or from the solid state body in operation H01L 23/48)}
21/76883		{Post-treatment or after-treatment of the conductive material}	22/34	. . {Circuits for electrically characterising or monitoring manufacturing processes, e. g. whole test die, wafers filled with test structures, on-board-devices incorporated on each die, process control monitors or pad structures thereof, devices in scribe line (switching, multiplexing, gating devices G01R 19/25 ; process control with lithography, e.g. dose control, G03F 7/20 ; structures for alignment control by optical means G03F 7/70633)}
21/76885		{By forming conductive members before deposition of protective insulating material, e.g. pillars, studs}		
21/76886		{Modifying permanently or temporarily the pattern or the conductivity of conductive members, e.g. formation of alloys, reduction of contact resistances}		
21/76888		{By rendering at least a portion of the conductor non conductive, e.g. oxidation}		
21/76889		{by forming silicides of refractory metals}		
21/76891		{by using superconducting materials}		
21/76892		{modifying the pattern}		
21/76894		{using a laser, e.g. laser cutting, laser direct writing, laser repair}		
21/76895		{Local interconnects; Local pads, as exemplified by patent document EP0896365}		
21/76897		{Formation of self-aligned vias or contact plugs, i.e. involving a lithographically uncritical step}		
21/76898		{formed through a semiconductor substrate}		
21/77	. .	Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in, or on, a common substrate (manufacture or treatment of electronic memory devices H10B)	23/00	Details of semiconductor or other solid state devices (H01L 25/00 takes precedence {; structural arrangements for testing or measuring during manufacture or treatment, or for reliability measurements H01L 22/00 ; arrangements for connecting or disconnecting semiconductor or solid-state bodies, or methods related thereto H01L 24/00 ; finger print sensors G06V 40/12)}
21/78	. . .	with subsequent division of the substrate into plural individual devices (cutting to change the surface-physical characteristics or shape of semiconductor bodies H01L 21/304)		NOTE This group <u>does not cover</u> : • details of semiconductor bodies or of electrodes of devices provided for in subclass H10D , which details are covered by that group; • details peculiar to devices provided for in a single subclass of subclasses H10F , H10H ,
21/7806		{involving the separation of the active layers from a substrate}		
21/7813		{leaving a reusable substrate, e.g. epitaxial lift off}		
22/00		{Testing or measuring during manufacture or treatment; Reliability measurements, i.e. testing of parts without further processing to modify the parts as such; Structural arrangements therefor}		

H01L

H01L 23/00

(continued)

[H10K](#) or [H10N](#), which details are covered by those places.

- 23/02 . Containers; Seals ([H01L 23/12](#), [H01L 23/34](#), [H01L 23/48](#), [H01L 23/552](#), {[H01L 23/66](#)} take precedence; {for memories [G11C](#)})
- 23/04 . . characterised by the shape {of the container or parts, e.g. caps, walls}
- 23/041 . . . {the container being a hollow construction having no base used as a mounting for the semiconductor body}
- 23/043 . . . the container being a hollow construction and having a conductive base as a mounting as well as a lead for the semiconductor body
- 23/045 the other leads having an insulating passage through the base
- 23/047 the other leads being parallel to the base
- 23/049 the other leads being perpendicular to the base
- 23/051 another lead being formed by a cover plate parallel to the base plate, e.g. sandwich type
- 23/053 . . . the container being a hollow construction and having an insulating {or insulated} base as a mounting for the semiconductor body
- 23/055 the leads having a passage through the base {([H01L 23/057](#) takes precedence)}
- 23/057 the leads being parallel to the base
- 23/06 . . characterised by the material of the container or its electrical properties
- 23/08 . . . the material being an electrical insulator, e.g. glass
- 23/10 . . characterised by the material or arrangement of seals between parts, e.g. between cap and base of the container or between leads and walls of the container
- 23/12 . Mountings, e.g. non-detachable insulating substrates
- 23/13 . . characterised by the shape
- 23/14 . . characterised by the material or its electrical properties {([printed circuit boards H05K 1/00](#))}
- 23/142 . . . {Metallic substrates having insulating layers}
- 23/145 . . . {Organic substrates, e.g. plastic}
- 23/147 . . . {Semiconductor insulating substrates (semiconductor conductive substrates [H01L 23/4926](#))}
- 23/15 . . . Ceramic or glass substrates {([H01L 23/142](#), [H01L 23/145](#), [H01L 23/147](#) take precedence)}
- 23/16 . Fillings or auxiliary members in containers {or encapsulations}, e.g. centering rings ([H01L 23/42](#), [H01L 23/552](#) take precedence)
- 23/18 . . Fillings characterised by the material, its physical or chemical properties, or its arrangement within the complete device

NOTE

Group [H01L 23/26](#) takes precedence over groups [H01L 23/20](#) - [H01L 23/24](#)

- 23/20 . . . gaseous at the normal operating temperature of the device
- 23/22 . . . liquid at the normal operating temperature of the device
- 23/24 . . . solid or gel at the normal operating temperature of the device {([H01L 23/3135](#) takes precedence)}

- 23/26 . . . including materials for absorbing or reacting with moisture or other undesired substances {, e.g. getters}
- 23/28 . Encapsulations, e.g. encapsulating layers, coatings, {e.g. for protection} ([H01L 23/552](#) takes precedence; {insulating layers for contacts or interconnections [H01L 23/5329](#)})
- 23/29 . . characterised by the material {, e.g. carbon (interlayer dielectrics [H01L 23/5329](#))}
- 23/291 . . . {Oxides or nitrides or carbides, e.g. ceramics, glass}
- 23/293 . . . {Organic, e.g. plastic}
- 23/295 {containing a filler ([H01L 23/296](#) takes precedence)}
- 23/296 {Organo-silicon compounds}
- 23/298 . . . {Semiconductor material, e.g. amorphous silicon}
- 23/31 . . characterised by the arrangement {or shape}
- 23/3107 . . . {the device being completely enclosed}
- 23/3114 {the device being a chip scale package, e.g. CSP}
- 23/3121 {a substrate forming part of the encapsulation}
- 23/3128 {the substrate having spherical bumps for external connection}
- 23/3135 {Double encapsulation or coating and encapsulation}
- 23/3142 {Sealing arrangements between parts, e.g. adhesion promoters}
- 23/315 {the encapsulation having a cavity}
- 23/3157 . . . {Partial encapsulation or coating (mask layer used as insulation layer [H01L 21/31](#))}
- 23/3164 {the coating being a foil}
- 23/3171 {the coating being directly applied to the semiconductor body, e.g. passivation layer ([H01L 23/3178](#) takes precedence)}
- 23/3178 {Coating or filling in grooves made in the semiconductor body}
- 23/3185 {the coating covering also the sidewalls of the semiconductor body}
- 23/3192 {Multilayer coating}
- 23/32 . Holders for supporting the complete device in operation, i.e. detachable fixtures ([H01L 23/40](#) takes precedence)
- 23/34 . Arrangements for cooling, heating, ventilating or temperature compensation {; Temperature sensing arrangements (thermal treatment apparatus [H01L 21/00](#))}
- 23/345 . . {Arrangements for heating (thermal treatment apparatus [H01L 21/00](#))}
- 23/36 . . Selection of materials, or shaping, to facilitate cooling or heating, e.g. heatsinks {([H01L 23/28](#), [H01L 23/40](#), [H01L 23/42](#), [H01L 23/44](#), [H01L 23/46](#) take precedence; heating [H01L 23/345](#))}
- 23/367 . . . Cooling facilitated by shape of device {([H01L 23/38](#), [H01L 23/40](#), [H01L 23/42](#), [H01L 23/44](#), [H01L 23/46](#) take precedence)}
- 23/3672 {Foil-like cooling fins or heat sinks (being part of lead-frames [H01L 23/49568](#))}
- 23/3675 {characterised by the shape of the housing}
- 23/3677 {Wire-like or pin-like cooling fins or heat sinks}

- 23/373 . . . Cooling facilitated by selection of materials for the device {or materials for thermal expansion adaptation, e.g. carbon}
 - 23/3731 {Ceramic materials or glass ([H01L 23/3732](#), [H01L 23/3733](#), [H01L 23/3735](#), [H01L 23/3737](#), [H01L 23/3738](#) take precedence)}
 - 23/3732 {Diamonds}
 - 23/3733 {having a heterogeneous or anisotropic structure, e.g. powder or fibres in a matrix, wire mesh, porous structures ([H01L 23/3732](#), [H01L 23/3737](#) take precedence)}
 - 23/3735 {Laminates or multilayers, e.g. direct bond copper ceramic substrates}
 - 23/3736 {Metallic materials ([H01L 23/3732](#), [H01L 23/3733](#), [H01L 23/3735](#), [H01L 23/3737](#), [H01L 23/3738](#) take precedence)}
 - 23/3737 {Organic materials with or without a thermoconductive filler}
 - 23/3738 {Semiconductor materials}
 - 23/38 . . Cooling arrangements using the Peltier effect
 - 23/40 . . Mountings or securing means for detachable cooling or heating arrangements {(heating [H01L 23/345](#)); fixed by friction, plugs or springs}
 - 23/4006 . . . {with bolts or screws}
 - 23/4012 {for stacked arrangements of a plurality of semiconductor devices ([assemblies per se](#) [H01L 25/00](#))}
 - 2023/4018 {characterised by the type of device to be heated or cooled}
 - 2023/4025 {Base discrete devices, e.g. presspack, disc-type transistors}
 - 2023/4031 {Packaged discrete devices, e.g. to-3 housings, diodes}
 - 2023/4037 {characterised by thermal path or place of attachment of heatsink}
 - 2023/4043 {heatsink to have chip}
 - 2023/405 {heatsink to package}
 - 2023/4056 {heatsink to additional heatsink}
 - 2023/4062 {heatsink to or through board or cabinet}
 - 2023/4068 {Heatconductors between device and heatsink, e.g. compliant heat-spreaders, heat-conducting bands}
 - 2023/4075 {Mechanical elements}
 - 2023/4081 {Compliant clamping elements not primarily serving heat-conduction}
 - 2023/4087 {Mounting accessories, interposers, clamping or screwing parts}
 - 23/4093 . . . {Snap-on arrangements, e.g. clips}
 - 23/42 . . Fillings or auxiliary members in containers {or encapsulations} selected or arranged to facilitate heating or cooling
 - 23/427 . . . Cooling by change of state, e.g. use of heat pipes {(by liquefied gas [H01L 23/445](#))}
 - 23/4275 {by melting or evaporation of solids}
 - 23/433 . . . Auxiliary members {in containers} characterised by their shape, e.g. pistons
 - 23/4332 {Bellows}
 - 23/4334 {Auxiliary members in encapsulations ([H01L 23/49568](#) takes precedence)}
 - 23/4336 {in combination with jet impingement}
 - 23/4338 {Pistons, e.g. spring-loaded members}
 - 23/44 . . the complete device being wholly immersed in a fluid other than air {([H01L 23/427](#) takes precedence)}
 - 23/445 . . . {the fluid being a liquefied gas, e.g. in a cryogenic vessel}
 - 23/46 . . involving the transfer of heat by flowing fluids ([H01L 23/42](#), [H01L 23/44](#) take precedence)
 - 23/467 . . . by flowing gases, e.g. air {([H01L 23/473](#) takes precedence)}
 - 23/473 . . . by flowing liquids {([H01L 23/4332](#), [H01L 23/4338](#) take precedence)}
 - 23/4735 {Jet impingement ([H01L 23/4336](#) takes precedence)}
 - 23/48 . Arrangements for conducting electric current to or from the solid state body in operation, e.g. leads, terminal arrangements {; Selection of materials therefor}
- NOTE**
- {Arrangements for connecting or disconnecting semiconductor or other solid state bodies, or methods related thereto, other than those arrangements or methods covered by the following subgroups, are covered by [H01L 24/00](#).}
- 23/481 . . {Internal lead connections, e.g. via connections, feedthrough structures}
 - 23/482 . . consisting of lead-in layers inseparably applied to the semiconductor body {(electrodes)}
 - 23/4821 . . . {Bridge structure with air gap}
 - 23/4822 . . . {Beam leads}
 - 23/4824 . . . {Pads with extended contours, e.g. grid structure, branch structure, finger structure}
 - 23/4825 . . . {for devices consisting of semiconductor layers on insulating or semi-insulating substrates, e.g. silicon on sapphire devices, i.e. SOS}
 - 23/4827 . . . {Materials}
 - 23/4828 {Conductive organic material or pastes, e.g. conductive adhesives, inks}
 - 23/485 . . . consisting of layered constructions comprising conductive layers and insulating layers, e.g. planar contacts {([H01L 23/4821](#), [H01L 23/4822](#), [H01L 23/4824](#), [H01L 23/4825](#) take precedence; materials [H01L 23/532](#), bond pads [H01L 24/02](#), bump connectors [H01L 24/10](#))}
 - 23/4855 {Overhang structure}
 - 23/488 . . consisting of soldered {or bonded} constructions {(bump connectors [H01L 24/01](#))}
 - 23/49 . . . wire-like {arrangements or pins or rods (using optical fibres [H01L 23/48](#); pins attached to insulating substrates [H01L 23/49811](#))}
 - 23/492 . . . Bases or plates {or solder therefor}
 - 23/4922 {having a heterogeneous or anisotropic structure}
 - 23/4924 {characterised by the materials}
 - 23/4926 {the materials containing semiconductor material}
 - 23/4928 {the materials containing carbon}
 - 23/495 . . . Lead-frames {or other flat leads ([H01L 23/498](#) takes precedence; lead frame interconnections between components [H01L 23/52](#))}
 - 23/49503 {characterised by the die pad}

- 23/49506 {an insulative substrate being used as a diepad, e.g. ceramic, plastic ([H01L 23/49531](#) takes precedence)}
- 23/4951 {Chip-on-leads or leads-on-chip techniques, i.e. inner lead fingers being used as die pad}
- 23/49513 {having bonding material between chip and die pad}
- 23/49517 {Additional leads}
- 23/4952 {the additional leads being a bump or a wire}
- 23/49524 {the additional leads being a tape carrier or flat leads}
- 23/49527 {the additional leads being a multilayer}
- 23/49531 {the additional leads being a wiring board}
- 23/49534 {Multi-layer}
- 23/49537 {Plurality of lead frames mounted in one device}
- 23/49541 {Geometry of the lead-frame}
- 23/49544 {Deformation absorbing parts in the lead frame plane, e.g. meanderline shape ([H01L 23/49562](#) takes precedence)}
- 23/49548 {Cross section geometry ([H01L 23/49562](#) takes precedence)}
- 23/49551 {characterised by bent parts}
- 23/49555 {the bent parts being the outer leads}
- 23/49558 {Insulating layers on lead frames, e.g. bridging members}
- 23/49562 {for individual devices of subclass [H10D](#)}
- 23/49565 {Side rails of the lead frame, e.g. with perforations, sprocket holes}
- 23/49568 {specifically adapted to facilitate heat dissipation}
- 23/49572 {consisting of thin flexible metallic tape with or without a film carrier ([H01L 23/49503](#) - [H01L 23/49568](#) and [H01L 23/49575](#) - [H01L 23/49579](#) take precedence)}
- 23/49575 {Assemblies of semiconductor devices on lead frames}
- 23/49579 {characterised by the materials of the lead frames or layers thereon}
- 23/49582 {Metallic layers on lead frames}
- 23/49586 {Insulating layers on lead frames}
- 23/49589 {Capacitor integral with or on the leadframe}
- 23/49593 {Battery in combination with a leadframe}
- 23/49596 {Oscillators in combination with lead-frames}
- 23/498 Leads, {i.e. metallisations or lead-frames} on insulating substrates, {e.g. chip carriers (shape of the substrate [H01L 23/13](#))}
- 23/49805 {the leads being also applied on the sidewalls or the bottom of the substrate, e.g. leadless packages for surface mounting}
- 23/49811 {Additional leads joined to the metallisation on the insulating substrate, e.g. pins, bumps, wires, flat leads ([H01L 23/49827](#) takes precedence)}
- 23/49816 {Spherical bumps on the substrate for external connection, e.g. ball grid arrays [BGA]}
- 23/49822 {Multilayer substrates (multilayer metallisation on monolayer substrate [H01L 23/498](#))}
- 23/49827 {Via connections through the substrates, e.g. pins going through the substrate, coaxial cables ([H01L 23/49822](#), [H01L 23/49833](#), [H01L 23/4985](#), [H01L 23/49861](#) take precedence)}
- 23/49833 {the chip support structure consisting of a plurality of insulating substrates}
- 23/49838 {Geometry or layout}
- 23/49844 {for individual devices of subclass [H10D](#)}
- 23/4985 {Flexible insulating substrates ([H01L 23/49572](#) and [H01L 23/49855](#) take precedence)}
- 23/49855 {for flat-cards, e.g. credit cards (cards [per se](#) [G06K 19/00](#))}
- 23/49861 {Lead-frames fixed on or encapsulated in insulating substrates ([H01L 23/4985](#), [H01L 23/49805](#) take precedence)}
- 23/49866 {characterised by the materials (materials of the substrates [H01L 23/14](#), of the lead-frames [H01L 23/49579](#))}
- 23/49872 {the conductive materials containing semiconductor material}
- 23/49877 {Carbon, e.g. fullerenes (superconducting fullerenes [H10N 60/853](#))}
- 23/49883 {the conductive materials containing organic materials or pastes, e.g. for thick films (for printed circuits [H05K 1/092](#))}
- 23/49888 {the conductive materials containing superconducting material}
- 23/49894 {Materials of the insulating layers or coatings}
- 23/50 for integrated circuit devices, {e.g. power bus, number of leads} ([H01L 23/482](#) - [H01L 23/498](#) take precedence)
- 23/52 Arrangements for conducting electric current within the device in operation from one component to another {, i.e. interconnections, e.g. wires, lead frames (optical interconnections [G02B 6/00](#))}
- 23/522 including external interconnections consisting of a multilayer structure of conductive and insulating layers inseparably formed on the semiconductor body
- 23/5221 {Crossover interconnections}
- 23/5222 {Capacitive arrangements or effects of, or between wiring layers (other capacitive arrangements [H01L 23/642](#))}
- 23/5223 {Capacitor integral with wiring layers}
- 23/5225 {Shielding layers formed together with wiring layers}
- 23/5226 {Via connections in a multilevel interconnection structure}
- 23/5227 {Inductive arrangements or effects of, or between, wiring layers (other inductive arrangements [H01L 23/645](#))}
- 23/5228 {Resistive arrangements or effects of, or between, wiring layers (other resistive arrangements [H01L 23/647](#))}
- 23/525 with adaptable interconnections
- 23/5252 {comprising anti-fuses, i.e. connections having their state changed from non-conductive to conductive}
- 23/5254 {the change of state resulting from the use of an external beam, e.g. laser beam or ion beam}

- 23/5256 {comprising fuses, i.e. connections having their state changed from conductive to non-conductive}
- 23/5258 {the change of state resulting from the use of an external beam, e.g. laser beam or ion beam}
- 23/528 Layout of the interconnection structure
- 23/5283 {Cross-sectional geometry}
- 23/5286 {Arrangements of power or ground buses}
- 23/532 characterised by the materials
- 23/53204 {Conductive materials}
- 23/53209 {based on metals, e.g. alloys, metal silicides ([H01L 23/53285](#) takes precedence)}
- 23/53214 {the principal metal being aluminium}
- 23/53219 {Aluminium alloys}
- 23/53223 {Additional layers associated with aluminium layers, e.g. adhesion, barrier, cladding layers}
- 23/53228 {the principal metal being copper}
- 23/53233 {Copper alloys}
- 23/53238 {Additional layers associated with copper layers, e.g. adhesion, barrier, cladding layers}
- 23/53242 {the principal metal being a noble metal, e.g. gold}
- 23/53247 {Noble-metal alloys}
- 23/53252 {Additional layers associated with noble-metal layers, e.g. adhesion, barrier, cladding layers}
- 23/53257 {the principal metal being a refractory metal}
- 23/53261 {Refractory-metal alloys}
- 23/53266 {Additional layers associated with refractory-metal layers, e.g. adhesion, barrier, cladding layers}
- 23/53271 {containing semiconductor material, e.g. polysilicon}
- 23/53276 {containing carbon, e.g. fullerenes ([superconducting fullerenes H10N 60/853](#))}
- 23/5328 {containing conductive organic materials or pastes, e.g. conductive adhesives, inks}
- 23/53285 {containing superconducting materials}
- 23/5329 {Insulating materials}
- 23/53295 {Stacked insulating layers}
- 23/535 including internal interconnections, e.g. cross-under constructions {(internal lead connections [H01L 23/481](#))}
- 23/538 the interconnection structure between a plurality of semiconductor chips being formed on, or in, insulating substrates {(H05K takes precedence; manufacture or treatment [H01L 21/4846](#) ; mountings per se [H01L 23/12](#); {materials [H01L 23/49866](#))}
- 23/5381 {Crossover interconnections, e.g. bridge stepovers}
- 23/5382 {Adaptable interconnections, e.g. for engineering changes}
- 23/5383 {Multilayer substrates ([H01L 23/5385](#) takes precedence; multilayer metallisation on monolayer substrates [H01L 23/538](#))}
- 23/5384 {Conductive vias through the substrate with or without pins, e.g. buried coaxial conductors ([H01L 23/5383](#), [H01L 23/5385](#) take precedence; pins attached to insulating substrates [H01L 23/49811](#))}
- 23/5385 {Assembly of a plurality of insulating substrates}
- 23/5386 {Geometry or layout of the interconnection structure}
- 23/5387 {Flexible insulating substrates ([H01L 23/5388](#) takes precedence)}
- 23/5388 {for flat cards, e.g. credit cards (cards per se [G06K 19/00](#))}
- 23/5389 {the chips being integrally enclosed by the interconnect and support structures}
- 23/544 Marks applied to semiconductor devices {or parts}, e.g. registration marks, {alignment structures, wafer maps (test patterns for characterising or monitoring manufacturing processes [H01L 22/00](#))}
- NOTE**
- {When classifying in group [H01L 23/544](#), details are to be further indexed by using the indexing codes chosen from [H01L 2223/544](#) and subgroups. }
- 23/552 Protection against radiation, e.g. light {or electromagnetic waves}
- 23/556 against alpha rays
- 23/562 {Protection against mechanical damage ([H01L 23/02](#), [H01L 23/28](#) take precedence)}
- 23/564 {Details not otherwise provided for, e.g. protection against moisture (getters [H01L 23/26](#))}
- 23/57 {Protection from inspection, reverse engineering or tampering}
- 23/573 {using passive means}
- 23/576 {using active circuits}
- 23/58 Structural electrical arrangements for semiconductor devices not otherwise provided for {, e.g. in combination with batteries ([H01L 23/49593](#), [H01L 23/49596](#) take precedence)}
- 23/585 {comprising conductive layers or plates or strips or rods or rings ([H01L 23/60](#), [H01L 23/62](#), [H01L 23/64](#), [H01L 23/66](#) take precedence)}
- 23/60 Protection against electrostatic charges or discharges, e.g. Faraday shields
- 23/62 Protection against overvoltage, e.g. fuses, shunts
- 23/64 Impedance arrangements
- 23/642 {Capacitive arrangements ([H01L 23/49589](#), [H01L 23/645](#), [H01L 23/647](#), [H01L 23/66](#) take precedence; capacitive effects between wiring layers on the semiconductor body [H01L 23/5222](#))}
- 23/645 {Inductive arrangements ([H01L 23/647](#), [H01L 23/66](#) take precedence)}
- 23/647 {Resistive arrangements ([H01L 23/66](#), [H01L 23/62](#) take precedence)}
- 23/66 High-frequency adaptations
- NOTE**
- {When classifying in group [H01L 23/66](#), details are to be further indexed by using the indexing codes chosen from [H01L 2223/66](#) and subgroups. }

24/00	{Arrangements for connecting or disconnecting semiconductor or solid-state bodies; Methods or apparatus related thereto}	24/10	. . {Bump connectors (bumps on insulating substrates, e.g. chip carriers, H01L 23/49816); Manufacturing methods related thereto}
	NOTES	24/11	. . . {Manufacturing methods (for bumps on insulating substrates H01L 21/4853)}
1.	This group <u>does not cover</u> :	24/12	. . . {Structure, shape, material or disposition of the bump connectors prior to the connecting process}
	• details of semiconductor bodies or of electrodes of devices provided for in subclass H10D , which details are covered by that group;	24/13	 {of an individual bump connector}
	• details peculiar to devices provided for in a single subclass of subclasses H10F , H10H , H10K or H10N , which details are covered by those places.	24/14	 {of a plurality of bump connectors}
	• printed circuits, which are covered by groups H05K 1/00 - H05K 1/189 ;	24/15	. . . {Structure, shape, material or disposition of the bump connectors after the connecting process}
	• apparatus or manufacturing processes for printed circuits, which are covered by groups H05K 3/00 - H05K 3/4685 ;	24/16	 {of an individual bump connector}
	• manufacture or treatment of parts, which are covered by group H01L 21/48 and subgroups except H01L 21/4885 - H01L 21/4896 ;	24/17	 {of a plurality of bump connectors}
	• assemblies of semiconductor devices, which are covered by groups H01L 21/50 - H01L 21/568 ;	24/18	. . {High density interconnect [HDI] connectors; Manufacturing methods related thereto (interconnection structure between a plurality of semiconductor chips H01L 23/5389)}
	• applying interconnections to be used for carrying current between separate components within a device, which is covered by group H01L 21/768 and subgroups;	24/19	. . . {Manufacturing methods of high density interconnect preforms}
	• containers or seals, which are covered by groups H01L 23/02 - H01L 23/10 ;	24/20	. . . {Structure, shape, material or disposition of high density interconnect preforms}
	• mountings, which are covered by groups H01L 23/12 - H01L 23/15 and subgroups;	24/23	. . . {Structure, shape, material or disposition of the high density interconnect connectors after the connecting process}
	• arrangements for cooling, heating, ventilating or temperature compensation, which are covered by groups H01L 23/34 - H01L 23/4735 ;	24/24	 {of an individual high density interconnect connector}
	• arrangements for conducting electric current, which are covered by groups H01L 23/48 - H01L 23/50 , and by groups H01L 23/52 - H01L 23/5389 ;	24/25	 {of a plurality of high density interconnect connectors}
	• structural electrical arrangements, which are covered by groups H01L 23/58 - H01L 23/66 ;	24/26	. . {Layer connectors, e.g. plate connectors, solder or adhesive layers; Manufacturing methods related thereto}
	• assemblies of semiconductor or other solid state devices, which are covered by groups H01L 25/00 - H01L 25/18 .	24/27	. . . {Manufacturing methods}
		24/28	. . . {Structure, shape, material or disposition of the layer connectors prior to the connecting process}
	2. In this group the following indexing codes are used : H01L 24/00 , H01L 2224/00 , H01L 2924/00 , and subgroups thereof	24/29	 {of an individual layer connector}
24/01	. {Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip-to-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto}	24/30	 {of a plurality of layer connectors}
24/02	. . {Bonding areas (on insulating substrates, e.g. chip carriers, H01L 23/49816 , H01L 23/49838 , H01L 23/5389); Manufacturing methods related thereto}	24/31	. . . {Structure, shape, material or disposition of the layer connectors after the connecting process}
24/03	. . . {Manufacturing methods}	24/32	 {of an individual layer connector}
24/04	. . . {Structure, shape, material or disposition of the bonding areas prior to the connecting process}	24/33	 {of a plurality of layer connectors}
24/05	 {of an individual bonding area}	24/34	. . {Strap connectors, e.g. copper straps for grounding power devices; Manufacturing methods related thereto}
24/06	 {of a plurality of bonding areas}	24/35	. . . {Manufacturing methods}
24/07	. . . {Structure, shape, material or disposition of the bonding areas after the connecting process}	24/36	. . . {Structure, shape, material or disposition of the strap connectors prior to the connecting process}
24/08	 {of an individual bonding area}	24/37	 {of an individual strap connector}
24/09	 {of a plurality of bonding areas}	24/38	 {of a plurality of strap connectors}
		24/39	. . . {Structure, shape, material or disposition of the strap connectors after the connecting process}
		24/40	 {of an individual strap connector}
		24/41	 {of a plurality of strap connectors}
		24/42	. . {Wire connectors; Manufacturing methods related thereto}
		24/43	. . . {Manufacturing methods}
		24/44	. . . {Structure, shape, material or disposition of the wire connectors prior to the connecting process}
		24/45	 {of an individual wire connector}
		24/46	 {of a plurality of wire connectors}

- 24/47 . . . {Structure, shape, material or disposition of the wire connectors after the connecting process}
 - 24/48 {of an individual wire connector}
 - 24/49 {of a plurality of wire connectors}
 - 24/50 . . {Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto (thin flexible metallic tape with or without a film carrier [H01L 23/49572](#), flexible insulating substrates [H01L 23/4985](#), [H01L 23/5387](#))}
 - 24/63 . . {Connectors not provided for in any of the groups [H01L 24/10](#) - [H01L 24/50](#) and subgroups; Manufacturing methods related thereto}
 - 24/64 . . . {Manufacturing methods}
 - 24/65 . . . {Structure, shape, material or disposition of the connectors prior to the connecting process}
 - 24/66 {of an individual connector}
 - 24/67 {of a plurality of connectors}
 - 24/68 . . . {Structure, shape, material or disposition of the connectors after the connecting process}
 - 24/69 {of an individual connector}
 - 24/70 {of a plurality of connectors}
 - 24/71 . {Means for bonding not being attached to, or not being formed on, the surface to be connected (holders for supporting the complete device in operation [H01L 23/32](#))}
 - 24/72 . . {Detachable connecting means consisting of mechanical auxiliary parts connecting the device, e.g. pressure contacts using springs or clips}
 - 24/73 . {Means for bonding being of different types provided for in two or more of groups [H01L 24/10](#), [H01L 24/18](#), [H01L 24/26](#), [H01L 24/34](#), [H01L 24/42](#), [H01L 24/50](#), [H01L 24/63](#), [H01L 24/71](#)}
 - 24/74 . {Apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies}
 - 24/741 . . {Apparatus for manufacturing means for bonding, e.g. connectors}
 - 24/742 . . . {Apparatus for manufacturing bump connectors}
 - 24/743 . . . {Apparatus for manufacturing layer connectors}
 - 24/744 . . . {Apparatus for manufacturing strap connectors}
 - 24/745 . . . {Apparatus for manufacturing wire connectors}
 - 24/75 . . {Apparatus for connecting with bump connectors or layer connectors}
 - 24/76 . . {Apparatus for connecting with build-up interconnects}
 - 24/77 . . {Apparatus for connecting with strap connectors}
 - 24/78 . . {Apparatus for connecting with wire connectors}
 - 24/79 . . {Apparatus for Tape Automated Bonding [TAB]}
 - 24/799 . . {Apparatus for disconnecting}
 - 24/80 . {Methods for connecting semiconductor or other solid state bodies using means for bonding being attached to, or being formed on, the surface to be connected}
 - 24/81 . . {using a bump connector}
 - 24/82 . . {by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI] (interconnection structure between a plurality of semiconductor chips [H01L 23/5389](#))}
 - 24/83 . . {using a layer connector}
 - 24/84 . . {using a strap connector}
 - 24/85 . . {using a wire connector (wire bonding in general [B23K 20/004](#))}
 - 24/86 . . {using tape automated bonding [TAB]}
 - 24/89 . . {using at least one connector not provided for in any of the groups [H01L 24/81](#) - [H01L 24/86](#)}
 - 24/90 . {Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips}
 - 24/91 . {Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups [H01L 24/80](#) - [H01L 24/90](#)}
 - 24/92 . . {Specific sequence of method steps}
 - 24/93 . {Batch processes}
 - 24/94 . . {at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices}
 - 24/95 . . {at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips}
 - 24/96 . . . {the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual assemblies after connecting}
 - 24/97 . . . {the devices being connected to a common substrate, e.g. interposer, said common substrate being separable into individual assemblies after connecting}
 - 24/98 . {Methods for disconnecting semiconductor or solid-state bodies}
 - 25/00 **Assemblies consisting of a plurality of semiconductor or other solid state devices (devices consisting of a plurality of solid-state components formed in or on a common substrate [H10D 89/00](#); photovoltaic modules or arrays of photovoltaic cells [H10F 19/00](#))**
- NOTE**
- {Due to the ongoing developments in class [H10](#) and related subclasses, the information displayed in notes, references and definitions of this main group and indents may not be entirely accurate. For each specific subject matter referred to in this main group and indents, users are invited to consult the relevant place in class [H10](#) and to consider the class [H10](#) information as correct, in case of conflict}
- 25/03 . all the devices being of a type provided for in a single subclass of subclasses [H10B](#), [H10D](#), [H10F](#), [H10H](#), [H10K](#) or [H10N](#), e.g. assemblies of rectifier diodes
 - 25/04 . . the devices not having separate containers
- WARNING**
- Group [H01L 25/04](#) is impacted by reclassification into groups [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 25/041 . . . {the devices being of a type provided for in subclass [H10F](#)}
- 25/042 {the devices being arranged next to each other (solar cells [H10F 19/00](#))}
- 25/043 {Stacked arrangements of devices}
- 25/065 . . . the devices being of a type provided for in group [H10D 89/00](#)

NOTE

{Group [H01L 25/0652](#) takes precedence over groups [H01L 25/0655](#) and [H01L 25/0657](#).}

WARNING

Group [H01L 25/065](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/0652 {the devices being arranged next and on each other, i.e. mixed assemblies}

WARNING

Group [H01L 25/0652](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/0655 {the devices being arranged next to each other}

WARNING

Group [H01L 25/0655](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/0657 {Stacked arrangements of devices}

WARNING

Group [H01L 25/0657](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/07 . . . the devices being of a type provided for in group subclass [H10D](#)

NOTE

{Group [H01L 25/071](#) takes precedence over groups [H01L 25/072](#) - [H01L 25/074](#).}

- 25/071 {the devices being arranged next and on each other, i.e. mixed assemblies}

- 25/072 {the devices being arranged next to each other}

- 25/073 {Apertured devices mounted on one or more rods passed through the apertures}

- 25/074 {Stacked arrangements of non-apertured devices}

- 25/075 . . . the devices being of a type provided for in group [H10H 20/00](#)

- 25/0753 {the devices being arranged next to each other}

- 25/0756 {Stacked arrangements of devices}

- 25/10 . . the devices having separate containers

- 25/105 . . . {the devices being integrated devices of class [H10](#)}

NOTE

{When classifying in group [H01L 25/105](#), details of the assemblies are to be further indexed by using the indexing codes chosen from [H01L 2225/1005](#) and subgroups.}

- 25/11 . . . the devices being of a type provided for in subclass [H10D](#)

NOTE

{Group [H01L 25/112](#) takes precedence over groups [H01L 25/115](#) and [H01L 25/117](#).}

- 25/112 {Mixed assemblies}

- 25/115 {the devices being arranged next to each other}

- 25/117 {Stacked arrangements of devices}

- 25/13 . . . the devices being of a type provided for in group [H10H 20/00](#)

- 25/16 . the devices being of types provided for in two or more different subclasses of [H10B](#), [H10D](#), [H10E](#), [H10H](#), [H10K](#) or [H10N](#), e.g. forming hybrid circuits

WARNING

Group [H01L 25/16](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/162 . . {the devices being mounted on two or more different substrates}

WARNING

Group [H01L 25/162](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/165 . . {Containers}

WARNING

Group [H01L 25/165](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/167 . . {comprising optoelectronic devices, e.g. LED, photodiodes}

WARNING

Group [H01L 25/167](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/18 . the devices being of the types provided for in two or more different main groups of the same subclass of [H10B](#), [H10D](#), [H10E](#), [H10H](#), [H10K](#) or [H10N](#)

WARNING

Group [H01L 25/18](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 19/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10K 65/00](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

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

- 25/50 . {Multistep manufacturing processes of assemblies consisting of devices, the devices being individual devices of subclass [H10D](#) or integrated devices of class [H10](#) ([H01L 21/50](#) takes precedence)}

2221/00 Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof covered by [H01L 21/00](#)

- 2221/10 . Applying interconnections to be used for carrying current between separate components within a device

- 2221/1005 . . Formation and after-treatment of dielectrics

- 2221/101 . . . Forming openings in dielectrics

- 2221/1015 for dual damascene structures

- 2221/1021 Pre-forming the dual damascene structure in a resist layer

- 2221/1026 the via being formed by burying a sacrificial pillar in the dielectric and removing the pillar

- 2221/1031 Dual damascene by forming vias in the via-level dielectric prior to deposition of the trench-level dielectric

- 2221/1036 Dual damascene with different via-level and trench-level dielectrics

- 2221/1042 . . . the dielectric comprising air gaps

- 2221/1047 the air gaps being formed by pores in the dielectric

- 2221/1052 . . . Formation of thin functional dielectric layers

- 2221/1057 in via holes or trenches

- 2221/1063 Sacrificial or temporary thin dielectric films in openings in a dielectric

- 2221/1068 . . Formation and after-treatment of conductors

- 2221/1073 . . . Barrier, adhesion or liner layers

- 2221/1078 Multiple stacked thin films not being formed in openings in dielectrics

- 2221/1084 Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. seed layers

- 2221/1089 Stacks of seed layers

- 2221/1094 . . . Conducting structures comprising nanotubes or nanowires

- 2221/67 . Apparatus for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components; Apparatus not specifically provided for elsewhere

- 2221/683 . . . for supporting or gripping
- 2221/68304 . . . using temporarily an auxiliary support
- 2221/68309 Auxiliary support including alignment aids
- 2221/68313 Auxiliary support including a cavity for storing a finished device, e.g. IC package, or a partly finished device, e.g. die, during manufacturing or mounting
- 2221/68318 Auxiliary support including means facilitating the separation of a device or wafer from the auxiliary support
- 2221/68322 Auxiliary support including means facilitating the selective separation of some of a plurality of devices from the auxiliary support
- 2221/68327 used during dicing or grinding
- 2221/68331 of passive members, e.g. die mounting substrate
- 2221/68336 involving stretching of the auxiliary support post dicing
- 2221/6834 used to protect an active side of a device or wafer
- 2221/68345 used as a support during the manufacture of self supporting substrates
- 2221/6835 used as a support during build up manufacturing of active devices
- 2221/68354 used to support diced chips prior to mounting
- 2221/68359 used as a support during manufacture of interconnect decals or build up layers
- 2221/68363 used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an intermediate handle substrate
- 2221/68368 used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate
- 2221/68372 used to support a device or wafer when forming electrical connections thereto
- 2221/68377 with parts of the auxiliary support remaining in the finished device
- 2221/68381 Details of chemical or physical process used for separating the auxiliary support from a device or wafer
- 2221/68386 Separation by peeling
- 2221/6839 using peeling wedge or knife or bar
- 2221/68395 using peeling wheel
- 2223/00** **Details relating to semiconductor or other solid state devices covered by the group [H01L 23/00](#)**
- 2223/544 . . Marks applied to semiconductor devices or parts
- 2223/54406 . . comprising alphanumeric information
- 2223/54413 . . comprising digital information, e.g. bar codes, data matrix
- 2223/5442 . . comprising non digital, non alphanumeric information, e.g. symbols
- 2223/54426 . . for alignment
- 2223/54433 . . containing identification or tracking information
- 2223/5444 . . . for electrical read out
- 2223/54446 . . . Wireless electrical read out
- 2223/54453 . . for use prior to dicing
- 2223/5446 . . . Located in scribe lines
- 2223/54466 . . . Located in a dummy or reference die
- 2223/54473 . . for use after dicing
- 2223/5448 . . . Located on chip prior to dicing and remaining on chip after dicing
- 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate
- 2223/54493 . . . Peripheral marks on wafers, e.g. orientation flats, notches, lot number
- 2223/58 . . Structural electrical arrangements for semiconductor devices not otherwise provided for
- 2223/64 . . Impedance arrangements
- 2223/66 . . . High-frequency adaptations
- 2223/6605 High-frequency electrical connections
- 2223/6611 Wire connections
- 2223/6616 Vertical connections, e.g. vias
- 2223/6622 Coaxial feed-throughs in active or passive substrates
- 2223/6627 Waveguides, e.g. microstrip line, strip line, coplanar line
- 2223/6633 Transition between different waveguide types
- 2223/6638 Differential pair signal lines
- 2223/6644 Packaging aspects of high-frequency amplifiers
- 2223/665 Bias feed arrangements
- 2223/6655 Matching arrangements, e.g. arrangement of inductive and capacitive components
- 2223/6661 for passive devices
- 2223/6666 for decoupling, e.g. bypass capacitors
- 2223/6672 for integrated passive components, e.g. semiconductor device with passive components only
- 2223/6677 for antenna, e.g. antenna included within housing of semiconductor device
- 2223/6683 for monolithic microwave integrated circuit [MMIC]
- 2223/6688 Mixed frequency adaptations, i.e. for operation at different frequencies
- 2223/6694 Optical signal interface included within high-frequency semiconductor device housing
- 2224/00** **Indexing scheme for arrangements for connecting or disconnecting semiconductor or solid-state bodies and methods related thereto as covered by [H01L 24/00](#)**
- 2224/01 . . Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip-to-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto
- 2224/02 . . Bonding areas; Manufacturing methods related thereto
- 2224/0212 . . . Auxiliary members for bonding areas, e.g. spacers
- 2224/02122 being formed on the semiconductor or solid-state body
- 2224/02123 inside the bonding area
- 2224/02125 Reinforcing structures
- 2224/02126 Collar structures
- 2224/0213 Alignment aids
- 2224/02135 Flow barrier
- 2224/0214 Structure of the auxiliary member
- 2224/02141 Multilayer auxiliary member
- 2224/02145 Shape of the auxiliary member
- 2224/0215 Material of the auxiliary member
- 2224/02163 on the bonding area
- 2224/02165 Reinforcing structures
- 2224/02166 Collar structures
- 2224/0217 Alignment aids

2224/02175		Flow barrier	2224/03011		Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
2224/0218		Structure of the auxiliary member	2224/03013		for holding or confining the bonding area, e.g. solder flow barrier
2224/02181		Multilayer auxiliary member	2224/03015		for aligning the bonding area, e.g. marks, spacers
2224/02185		Shape of the auxiliary member	2224/03019		for protecting parts during the process
2224/0219		Material of the auxiliary member	2224/031		Manufacture and pre-treatment of the bonding area preform
2224/022		Protective coating, i.e. protective bond-through coating	2224/0311		Shaping
2224/02205		Structure of the protective coating	2224/0312		Applying permanent coating
2224/02206		Multilayer protective coating	2224/033		by local deposition of the material of the bonding area
2224/0221		Shape of the protective coating	2224/0331		in liquid form
2224/02215		Material of the protective coating	2224/03312		Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
2224/02233		not in direct contact with the bonding area	2224/03318		by dispensing droplets
2224/02235		Reinforcing structures	2224/0332		Screen printing, i.e. using a stencil
2224/0224		Alignment aids	2224/0333		in solid form
2224/02245		Flow barrier	2224/03332		using a powder
2224/0225		Structure of the auxiliary member	2224/03334		using a preform
2224/02251		Multilayer auxiliary member	2224/034		by blanket deposition of the material of the bonding area
2224/02255		Shape of the auxiliary member	2224/0341		in liquid form
2224/0226		Material of the auxiliary member	2224/03416		Spin coating
2224/023	. . .	Redistribution layers [RDL] for bonding areas	2224/03418		Spray coating
2224/0231		Manufacturing methods of the redistribution layers	2224/0342		Curtain coating
2224/02311		Additive methods	2224/03422		by dipping, e.g. in a solder bath
2224/02313		Subtractive methods	2224/03424		Immersion coating, e.g. in a solder bath
2224/02315		Self-assembly processes	2224/03426		Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/02317		by local deposition	2224/03428		Wave coating
2224/02319		by using a preform	2224/0343		in solid form
2224/02321		Reworking	2224/03436		Lamination of a preform, e.g. foil, sheet or layer
2224/0233		Structure of the redistribution layers	2224/03438		the preform being at least partly pre-patterned
2224/02331		Multilayer structure	2224/0344		by transfer printing
2224/02333		being a bump	2224/03442		using a powder
2224/02335		Free-standing redistribution layers	2224/03444		in gaseous form
2224/0235		Shape of the redistribution layers	2224/0345		Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/02351		comprising interlocking features	2224/03452		Chemical vapour deposition [CVD], e.g. laser CVD
2224/0236		Shape of the insulating layers therebetween	2224/0346		Plating
2224/0237		Disposition of the redistribution layers	2224/03462		Electroplating
2224/02371		connecting the bonding area on a surface of the semiconductor or solid-state body with another surface of the semiconductor or solid-state body	2224/03464		Electroless plating
2224/02372		connecting to a via connection in the semiconductor or solid-state body	2224/03466		Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
2224/02373		Layout of the redistribution layers	2224/0347		using a lift-off mask
2224/02375		Top view	2224/03472		Profile of the lift-off mask
2224/02377		Fan-in arrangement	2224/03474		Multilayer masks
2224/02379		Fan-out arrangement	2224/0348		Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
2224/02381		Side view	2224/035		by chemical or physical modification of a pre-existing or pre-deposited material
2224/0239		Material of the redistribution layers	2224/03502		Pre-existing or pre-deposited material
2224/024		Material of the insulating layers therebetween	2224/03505		Sintering
2224/03	. . .	Manufacturing methods	2224/0351		Anodisation
2224/03001		Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate			
2224/03002		for supporting the semiconductor or solid-state body			
2224/03003		for holding or transferring a preform			
2224/03005		for aligning the bonding area, e.g. marks, spacers			
2224/03009		for protecting parts during manufacture			

2224/03515		Curing and solidification, e.g. of a photosensitive material	2224/03901		with repetition of the same manufacturing step
2224/0352		Self-assembly, e.g. self-agglomeration of the material in a fluid	2224/03902		Multiple masking steps
2224/03522		Auxiliary means therefor, e.g. for self-assembly activation	2224/03903		using different masks
2224/03524		with special adaptation of the surface of the body to be connected or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process	2224/03906		with modification of the same mask
2224/0355		Selective modification	2224/0391		Forming a passivation layer after forming the bonding area
2224/03552		using a laser or a focussed ion beam [FIB]	2224/03912		the bump being used as a mask for patterning the bonding area
2224/03554		Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin	2224/03914		the bonding area, e.g. under bump metallisation [UBM], being used as a mask for patterning other parts
2224/036		by patterning a pre-deposited material	2224/03916		a passivation layer being used as a mask for patterning the bonding area
2224/03602		Mechanical treatment, e.g. polishing, grinding	2224/0392		specifically adapted to include a probing step
2224/0361		Physical or chemical etching	2224/03921		by repairing the bonding area damaged by the probing step
2224/03612		by physical means only	2224/04		Structure, shape, material or disposition of the bonding areas prior to the connecting process
2224/03614		by chemical means only	2224/0401		Bonding areas specifically adapted for bump connectors, e.g. under bump metallisation [UBM]
2224/03616		Chemical mechanical polishing [CMP]	2224/04026		Bonding areas specifically adapted for layer connectors
2224/03618		with selective exposure, development and removal of a photosensitive material, e.g. of a photosensitive conductive resin	2224/04034		Bonding areas specifically adapted for strap connectors
2224/0362		Photolithography	2224/04042		Bonding areas specifically adapted for wire connectors, e.g. wirebond pads
2224/03622		using masks	2224/0405		Bonding areas specifically adapted for tape automated bonding [TAB] connectors
2224/0363		using a laser or a focused ion beam [FIB]	2224/04073		Bonding areas specifically adapted for connectors of different types
2224/03632		Ablation by means of a laser or focused ion beam [FIB]	2224/04105		Bonding areas formed on an encapsulation of the semiconductor or solid-state body, e.g. bonding areas on chip-scale packages
2224/037		involving monitoring, e.g. feedback loop	2224/05		of an individual bonding area
2224/038		Post-treatment of the bonding area	2224/05001		Internal layers
2224/0381		Cleaning, e.g. oxide removal step, desmearing	2224/05005		Structure
2224/0382		Applying permanent coating, e.g. in-situ coating	2224/05006		Dual damascene structure
2224/03821		Spray coating	2224/05007		comprising a core and a coating
2224/03822		by dipping, e.g. in a solder bath	2224/05008		Bonding area integrally formed with a redistribution layer on the semiconductor or solid-state body, e.g.
2224/03823		Immersion coating, e.g. in a solder bath	2224/05009		Bonding area integrally formed with a via connection of the semiconductor or solid-state body
2224/03824		Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/0501		Shape
2224/03825		Plating, e.g. electroplating, electroless plating	2224/05011		comprising apertures or cavities
2224/03826		Physical vapour deposition [PVD], e.g. evaporation, or sputtering	2224/05012		in top view
2224/03827		Chemical vapour deposition [CVD], e.g. laser CVD	2224/05013		being rectangular
2224/03828		Applying flux	2224/05014		being square
2224/03829		Applying a precursor material	2224/05015		being circular or elliptic
2224/0383		Reworking, e.g. shaping	2224/05016		in side view
2224/03831		involving a chemical process, e.g. etching the bonding area	2224/05017		comprising protrusions or indentations
2224/0384		involving a mechanical process, e.g. planarising the bonding area	2224/05018		being a conformal layer on a patterned surface
2224/03845		Chemical mechanical polishing [CMP]	2224/05019		being a non conformal layer on a patterned surface
2224/03848		Thermal treatments, e.g. annealing, controlled cooling	2224/0502		Disposition
2224/03849		Reflowing	2224/05022		the internal layer being at least partially embedded in the surface
2224/039		Methods of manufacturing bonding areas involving a specific sequence of method steps			

2224/05023		the whole internal layer protruding from the surface	2224/05114		Thallium [Tl] as principal constituent
2224/05024		the internal layer being disposed on a redistribution layer on the semiconductor or solid-state body	2224/05116		Lead [Pb] as principal constituent
2224/05025		the internal layer being disposed on a via connection of the semiconductor or solid-state body	2224/05117		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05026		the internal layer being disposed in a recess of the surface	2224/05118		Zinc [Zn] as principal constituent
2224/05027		the internal layer extending out of an opening	2224/0512		Antimony [Sb] as principal constituent
2224/05073		Single internal layer	2224/05123		Magnesium [Mg] as principal constituent
2224/05075		Plural internal layers	2224/05124		Aluminium [Al] as principal constituent
2224/05076		being mutually engaged together, e.g. through inserts	2224/05138		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05078		being disposed next to each other, e.g. side-to-side arrangements	2224/05139		Silver [Ag] as principal constituent
2224/0508		being stacked	2224/05144		Gold [Au] as principal constituent
2224/05082		Two-layer arrangements	2224/05147		Copper [Cu] as principal constituent
2224/05083		Three-layer arrangements	2224/05149		Manganese [Mn] as principal constituent
2224/05084		Four-layer arrangements	2224/05155		Nickel [Ni] as principal constituent
2224/05085		with additional elements, e.g. vias arrays, interposed between the stacked layers	2224/05157		Cobalt [Co] as principal constituent
2224/05086		Structure of the additional element	2224/0516		Iron [Fe] as principal constituent
2224/05087		being a via with at least a lining layer	2224/05163		the principal constituent melting at a temperature of greater than 1550°C
2224/05088		Shape of the additional element	2224/05164		Palladium [Pd] as principal constituent
2224/05089		Disposition of the additional element	2224/05166		Titanium [Ti] as principal constituent
2224/0509		of a single via	2224/05169		Platinum [Pt] as principal constituent
2224/05091		at the center of the internal layers	2224/0517		Zirconium [Zr] as principal constituent
2224/05092		at the periphery of the internal layers	2224/05171		Chromium [Cr] as principal constituent
2224/05093		of a plurality of vias	2224/05172		Vanadium [V] as principal constituent
2224/05094		at the center of the internal layers	2224/05173		Rhodium [Rh] as principal constituent
2224/05095		at the periphery of the internal layers	2224/05176		Ruthenium [Ru] as principal constituent
2224/05096		Uniform arrangement, i.e. array	2224/05178		Iridium [Ir] as principal constituent
2224/05097		Random arrangement	2224/05179		Niobium [Nb] as principal constituent
2224/05098		Material of the additional element	2224/0518		Molybdenum [Mo] as principal constituent
2224/05099		Material	2224/05181		Tantalum [Ta] as principal constituent
2224/051		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05183		Rhenium [Re] as principal constituent
2224/05101		the principal constituent melting at a temperature of less than 400°C	2224/05184		Tungsten [W] as principal constituent
2224/05105		Gallium [Ga] as principal constituent	2224/05186		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05109		Indium [In] as principal constituent			
2224/05111		Tin [Sn] as principal constituent			
2224/05113		Bismuth [Bi] as principal constituent			

2224/05187		Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/05224		Aluminium [Al] as principal constituent
2224/05188		Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/05238		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/0519		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05239		Silver [Ag] as principal constituent
2224/05191		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05244		Gold [Au] as principal constituent
2224/05193		with a principal constituent of the material being a solid not provided for in groups H01L 2224/051 - H01L 2224/05191 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05247		Copper [Cu] as principal constituent
2224/05194		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/051 - H01L 2224/05191	2224/05249		Manganese [Mn] as principal constituent
2224/05195		with a principal constituent of the material being a gas not provided for in groups H01L 2224/051 - H01L 2224/05191	2224/05255		Nickel [Ni] as principal constituent
2224/05198		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05257		Cobalt [Co] as principal constituent
2224/05199		Material of the matrix	2224/0526		Iron [Fe] as principal constituent
2224/052		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05263		the principal constituent melting at a temperature of greater than 1550°C
2224/05201		the principal constituent melting at a temperature of less than 400°C	2224/05264		Palladium [Pd] as principal constituent
2224/05205		Gallium [Ga] as principal constituent	2224/05266		Titanium [Ti] as principal constituent
2224/05209		Indium [In] as principal constituent	2224/05269		Platinum [Pt] as principal constituent
2224/05211		Tin [Sn] as principal constituent	2224/0527		Zirconium [Zr] as principal constituent
2224/05213		Bismuth [Bi] as principal constituent	2224/05271		Chromium [Cr] as principal constituent
2224/05214		Thallium [Tl] as principal constituent	2224/05272		Vanadium [V] as principal constituent
2224/05216		Lead [Pb] as principal constituent	2224/05273		Rhodium [Rh] as principal constituent
2224/05217		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05276		Ruthenium [Ru] as principal constituent
2224/05218		Zinc [Zn] as principal constituent	2224/05278		Iridium [Ir] as principal constituent
2224/0522		Antimony [Sb] as principal constituent	2224/05279		Niobium [Nb] as principal constituent
2224/05223		Magnesium [Mg] as principal constituent	2224/0528		Molybdenum [Mo] as principal constituent
			2224/05281		Tantalum [Ta] as principal constituent
			2224/05283		Rhenium [Re] as principal constituent
			2224/05284		Tungsten [W] as principal constituent
			2224/05286		with a principal constituent of the material being a non metallic, non metalloid inorganic material
			2224/05287		Ceramics, e.g. crystalline carbides, nitrides or oxides
			2224/05288		Glasses, e.g. amorphous oxides, nitrides or fluorides
			2224/0529		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/05291		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05349		Manganese [Mn] as principal constituent
2224/05293		with a principal constituent of the material being a solid not provided for in groups H01L 2224/052 - H01L 2224/05291 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05355		Nickel [Ni] as principal constituent
2224/05294		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/052 - H01L 2224/05291	2224/05357		Cobalt [Co] as principal constituent
2224/05295		with a principal constituent of the material being a gas not provided for in groups H01L 2224/052 - H01L 2224/05291	2224/0536		Iron [Fe] as principal constituent
2224/05298		Fillers	2224/05363		the principal constituent melting at a temperature of greater than 1550°C
2224/05299		Base material	2224/05364		Palladium [Pd] as principal constituent
2224/053		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05366		Titanium [Ti] as principal constituent
2224/05301		the principal constituent melting at a temperature of less than 400°C	2224/05369		Platinum [Pt] as principal constituent
2224/05305		Gallium [Ga] as principal constituent	2224/0537		Zirconium [Zr] as principal constituent
2224/05309		Indium [In] as principal constituent	2224/05371		Chromium [Cr] as principal constituent
2224/05311		Tin [Sn] as principal constituent	2224/05372		Vanadium [V] as principal constituent
2224/05313		Bismuth [Bi] as principal constituent	2224/05373		Rhodium [Rh] as principal constituent
2224/05314		Thallium [Tl] as principal constituent	2224/05376		Ruthenium [Ru] as principal constituent
2224/05316		Lead [Pb] as principal constituent	2224/05378		Iridium [Ir] as principal constituent
2224/05317		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05379		Niobium [Nb] as principal constituent
2224/05318		Zinc [Zn] as principal constituent	2224/0538		Molybdenum [Mo] as principal constituent
2224/0532		Antimony [Sb] as principal constituent	2224/05381		Tantalum [Ta] as principal constituent
2224/05323		Magnesium [Mg] as principal constituent	2224/05383		Rhenium [Re] as principal constituent
2224/05324		Aluminium [Al] as principal constituent	2224/05384		Tungsten [W] as principal constituent
2224/05338		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/05386		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05339		Silver [Ag] as principal constituent	2224/05387		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/05344		Gold [Au] as principal constituent	2224/05388		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/05347		Copper [Cu] as principal constituent	2224/0539		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
			2224/05391		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
			2224/05393		with a principal constituent of the material being a solid not provided for in groups H01L 2224/053 - H01L 2224/05391 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
			2224/05394		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/053 - H01L 2224/05391

2224/05395	with a principal constituent of the material being a gas not provided for in groups H01L 2224/053 - H01L 2224/05391	2224/05463	the principal constituent melting at a temperature of greater than 1550°C
2224/05398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05464	Palladium [Pd] as principal constituent
2224/05399	Coating material	2224/05466	Titanium [Ti] as principal constituent
2224/054	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05469	Platinum [Pt] as principal constituent
2224/05401	the principal constituent melting at a temperature of less than 400°C	2224/0547	Zirconium [Zr] as principal constituent
2224/05405	Gallium [Ga] as principal constituent	2224/05471	Chromium [Cr] as principal constituent
2224/05409	Indium [In] as principal constituent	2224/05472	Vanadium [V] as principal constituent
2224/05411	Tin [Sn] as principal constituent	2224/05473	Rhodium [Rh] as principal constituent
2224/05413	Bismuth [Bi] as principal constituent	2224/05476	Ruthenium [Ru] as principal constituent
2224/05414	Thallium [Tl] as principal constituent	2224/05478	Iridium [Ir] as principal constituent
2224/05416	Lead [Pb] as principal constituent	2224/05479	Niobium [Nb] as principal constituent
2224/05417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/0548	Molybdenum [Mo] as principal constituent
2224/05418	Zinc [Zn] as principal constituent	2224/05481	Tantalum [Ta] as principal constituent
2224/0542	Antimony [Sb] as principal constituent	2224/05483	Rhenium [Re] as principal constituent
2224/05423	Magnesium [Mg] as principal constituent	2224/05484	Tungsten [W] as principal constituent
2224/05424	Aluminium [Al] as principal constituent	2224/05486	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/05487	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/05439	Silver [Ag] as principal constituent	2224/05488	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/05444	Gold [Au] as principal constituent	2224/0549	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05447	Copper [Cu] as principal constituent	2224/05491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05449	Manganese [Mn] as principal constituent	2224/05493	with a principal constituent of the material being a solid not provided for in groups H01L 2224/054 - H01L 2224/05491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05455	Nickel [Ni] as principal constituent	2224/05494	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/054 - H01L 2224/05491
2224/05457	Cobalt [Co] as principal constituent	2224/05495	with a principal constituent of the material being a gas not provided for in groups H01L 2224/054 - H01L 2224/05491
2224/0546	Iron [Fe] as principal constituent		

2224/05498	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05584	Four-layer coating
2224/05499	Shape or distribution of the fillers	2224/05599	Material
2224/0554	External layer	2224/056	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05541	Structure	2224/05601	the principal constituent melting at a temperature of less than 400°C
2224/05546	Dual damascene structure	2224/05605	Gallium [Ga] as principal constituent
2224/05547	comprising a core and a coating	2224/05609	Indium [In] as principal constituent
2224/05548	Bonding area integrally formed with a redistribution layer on the semiconductor or solid-state body	2224/05611	Tin [Sn] as principal constituent
2224/0555	Shape	2224/05613	Bismuth [Bi] as principal constituent
2224/05551	comprising apertures or cavities	2224/05614	Thallium [Tl] as principal constituent
2224/05552	in top view	2224/05616	Lead [Pb] as principal constituent
2224/05553	being rectangular	2224/05617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05554	being square	2224/05618	Zinc [Zn] as principal constituent
2224/05555	being circular or elliptic	2224/0562	Antimony [Sb] as principal constituent
2224/05556	in side view	2224/05623	Magnesium [Mg] as principal constituent
2224/05557	comprising protrusions or indentations	2224/05624	Aluminium [Al] as principal constituent
2224/05558	conformal layer on a patterned surface	2224/05638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05559	non conformal layer on a patterned surface	2224/05639	Silver [Ag] as principal constituent
2224/0556	Disposition	2224/05644	Gold [Au] as principal constituent
2224/05561	On the entire surface of the internal layer	2224/05647	Copper [Cu] as principal constituent
2224/05562	On the entire exposed surface of the internal layer	2224/05649	Manganese [Mn] as principal constituent
2224/05563	Only on parts of the surface of the internal layer	2224/05655	Nickel [Ni] as principal constituent
2224/05564	Only on the bonding interface of the bonding area	2224/05657	Cobalt [Co] as principal constituent
2224/05565	Only outside the bonding interface of the bonding area	2224/0566	Iron [Fe] as principal constituent
2224/05566	Both on and outside the bonding interface of the bonding area	2224/05663	the principal constituent melting at a temperature of greater than 1550°C
2224/05567	the external layer being at least partially embedded in the surface	2224/05664	Palladium [Pd] as principal constituent
2224/05568	the whole external layer protruding from the surface	2224/05666	Titanium [Ti] as principal constituent
2224/05569	the external layer being disposed on a redistribution layer on the semiconductor or solid-state body	2224/05669	Platinum [Pt] as principal constituent
2224/0557	the external layer being disposed on a via connection of the semiconductor or solid-state body	2224/0567	Zirconium [Zr] as principal constituent
2224/05571	the external layer being disposed in a recess of the surface	2224/05671	Chromium [Cr] as principal constituent
2224/05572	the external layer extending out of an opening	2224/05672	Vanadium [V] as principal constituent
2224/05573	Single external layer	2224/05673	Rhodium [Rh] as principal constituent
2224/05575	Plural external layers		
2224/05576	being mutually engaged together, e.g. through inserts		
2224/05578	being disposed next to each other, e.g. side-to-side arrangements		
2224/0558	being stacked		
2224/05582	Two-layer coating		
2224/05583	Three-layer coating		

2224/05676	Ruthenium [Ru] as principal constituent	2224/05713	Bismuth [Bi] as principal constituent
2224/05678	Iridium [Ir] as principal constituent	2224/05714	Thallium [Tl] as principal constituent
2224/05679	Niobium [Nb] as principal constituent	2224/05716	Lead [Pb] as principal constituent
2224/0568	Molybdenum [Mo] as principal constituent	2224/05717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05681	Tantalum [Ta] as principal constituent	2224/05718	Zinc [Zn] as principal constituent
2224/05683	Rhenium [Re] as principal constituent	2224/0572	Antimony [Sb] as principal constituent
2224/05684	Tungsten [W] as principal constituent	2224/05723	Magnesium [Mg] as principal constituent
2224/05686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/05724	Aluminium [Al] as principal constituent
2224/05687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/05738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/05739	Silver [Ag] as principal constituent
2224/0569	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05744	Gold [Au] as principal constituent
2224/05691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05747	Copper [Cu] as principal constituent
2224/05693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/056 - H01L 2224/05691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05749	Manganese [Mn] as principal constituent
2224/05694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/056 - H01L 2224/05691	2224/05755	Nickel [Ni] as principal constituent
2224/05695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/056 - H01L 2224/05691	2224/05757	Cobalt [Co] as principal constituent
2224/05698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/0576	Iron [Fe] as principal constituent
2224/05699	Material of the matrix	2224/05763	the principal constituent melting at a temperature of greater than 1550°C
2224/057	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05764	Palladium [Pd] as principal constituent
2224/05701	the principal constituent melting at a temperature of less than 400°C	2224/05766	Titanium [Ti] as principal constituent
2224/05705	Gallium [Ga] as principal constituent	2224/05769	Platinum [Pt] as principal constituent
2224/05709	Indium [In] as principal constituent	2224/0577	Zirconium [Zr] as principal constituent
2224/05711	Tin [Sn] as principal constituent	2224/05771	Chromium [Cr] as principal constituent
		2224/05772	Vanadium [V] as principal constituent
		2224/05773	Rhodium [Rh] as principal constituent
		2224/05776	Ruthenium [Ru] as principal constituent
		2224/05778	Iridium [Ir] as principal constituent
		2224/05779	Niobium [Nb] as principal constituent
		2224/0578	Molybdenum [Mo] as principal constituent
		2224/05781	Tantalum [Ta] as principal constituent

2224/05783	Rhenium [Re] as principal constituent	2224/05823	Magnesium [Mg] as principal constituent
2224/05784	Tungsten [W] as principal constituent	2224/05824	Aluminium [Al] as principal constituent
2224/05786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/05838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/05839	Silver [Ag] as principal constituent
2224/05788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/05844	Gold [Au] as principal constituent
2224/0579	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05847	Copper [Cu] as principal constituent
2224/05791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05849	Manganese [Mn] as principal constituent
2224/05793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/057 - H01L 2224/05791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05855	Nickel [Ni] as principal constituent
2224/05794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791	2224/05857	Cobalt [Co] as principal constituent
2224/05795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/057 - H01L 2224/05791	2224/0586	Iron [Fe] as principal constituent
2224/05798	Fillers	2224/05863	the principal constituent melting at a temperature of greater than 1550°C
2224/05799	Base material	2224/05864	Palladium [Pd] as principal constituent
2224/058	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05866	Titanium [Ti] as principal constituent
2224/05801	the principal constituent melting at a temperature of less than 400°C	2224/05869	Platinum [Pt] as principal constituent
2224/05805	Gallium [Ga] as principal constituent	2224/0587	Zirconium [Zr] as principal constituent
2224/05809	Indium [In] as principal constituent	2224/05871	Chromium [Cr] as principal constituent
2224/05811	Tin [Sn] as principal constituent	2224/05872	Vanadium [V] as principal constituent
2224/05813	Bismuth [Bi] as principal constituent	2224/05873	Rhodium [Rh] as principal constituent
2224/05814	Thallium [Tl] as principal constituent	2224/05876	Ruthenium [Ru] as principal constituent
2224/05816	Lead [Pb] as principal constituent	2224/05878	Iridium [Ir] as principal constituent
2224/05817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05879	Niobium [Nb] as principal constituent
2224/05818	Zinc [Zn] as principal constituent	2224/0588	Molybdenum [Mo] as principal constituent
2224/0582	Antimony [Sb] as principal constituent	2224/05881	Tantalum [Ta] as principal constituent
		2224/05883	Rhenium [Re] as principal constituent
		2224/05884	Tungsten [W] as principal constituent
		2224/05886	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/05887	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/05888	Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/0589	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05939	Silver [Ag] as principal constituent
2224/05893	with a principal constituent of the material being a solid not provided for in groups H01L 2224/058 - H01L 2224/05891	2224/05944	Gold [Au] as principal constituent
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05947	Copper [Cu] as principal constituent
2224/05894	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/058 - H01L 2224/05891	2224/05949	Manganese [Mn] as principal constituent
2224/05895	with a principal constituent of the material being a gas not provided for in groups H01L 2224/058 - H01L 2224/05891	2224/05955	Nickel [Ni] as principal constituent
2224/05898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05957	Cobalt [Co] as principal constituent
2224/05899	Coating material	2224/0596	Iron [Fe] as principal constituent
2224/059	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05963	the principal constituent melting at a temperature of greater than 1550°C
2224/05901	the principal constituent melting at a temperature of less than 400°C	2224/05964	Palladium [Pd] as principal constituent
2224/05905	Gallium [Ga] as principal constituent	2224/05966	Titanium [Ti] as principal constituent
2224/05909	Indium [In] as principal constituent	2224/05969	Platinum [Pt] as principal constituent
2224/05911	Tin [Sn] as principal constituent	2224/0597	Zirconium [Zr] as principal constituent
2224/05913	Bismuth [Bi] as principal constituent	2224/05971	Chromium [Cr] as principal constituent
2224/05914	Thallium [Tl] as principal constituent	2224/05972	Vanadium [V] as principal constituent
2224/05916	Lead [Pb] as principal constituent	2224/05973	Rhodium [Rh] as principal constituent
2224/05917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05976	Ruthenium [Ru] as principal constituent
2224/05918	Zinc [Zn] as principal constituent	2224/05978	Iridium [Ir] as principal constituent
2224/0592	Antimony [Sb] as principal constituent	2224/05979	Niobium [Nb] as principal constituent
2224/05923	Magnesium [Mg] as principal constituent	2224/0598	Molybdenum [Mo] as principal constituent
2224/05924	Aluminium [Al] as principal constituent	2224/05981	Tantalum [Ta] as principal constituent
		2224/05983	Rhenium [Re] as principal constituent
		2224/05984	Tungsten [W] as principal constituent
		2224/05986	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/05987	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/05988	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/0599	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/05991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/05993	with a principal constituent of the material being a solid not provided for in groups H01L 2224/059 - H01L 2224/05991 e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/06145	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/05994	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/059 - H01L 2224/05991	2224/06146	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/05995	with a principal constituent of the material being a gas not provided for in groups H01L 2224/059 - H01L 2224/05991	2224/06147	with specially adapted redistribution layers [RDL]
2224/05998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/06148	being disposed in a single wiring level, i.e. planar layout
2224/05999	Shape or distribution of the fillers	2224/06149	being disposed in different wiring levels, i.e. resurf layout
2224/06	of a plurality of bonding areas	2224/0615	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/0601	Structure	2224/06151	being uniform, i.e. having a uniform pitch across the array
2224/0603	Bonding areas having different sizes, e.g. different heights or widths	2224/06152	being non uniform, i.e. having a non uniform pitch across the array
2224/0605	Shape	2224/06153	with a staggered arrangement, e.g. depopulated array
2224/06051	Bonding areas having different shapes	2224/06154	covering only portions of the surface to be connected
2224/061	Disposition	2224/06155	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06102	the bonding areas being at different heights	2224/06156	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/0612	Layout	2224/06157	with specially adapted redistribution layers [RDL]
2224/0613	Square or rectangular array	2224/06158	being disposed in a single wiring level, i.e. planar layout
2224/06131	being uniform, i.e. having a uniform pitch across the array	2224/06159	being disposed in different wiring levels, i.e. resurf layout
2224/06132	being non uniform, i.e. having a non uniform pitch across the array	2224/0616	Random array, i.e. array with no symmetry
2224/06133	with a staggered arrangement, e.g. depopulated array	2224/06163	with a staggered arrangement
2224/06134	covering only portions of the surface to be connected	2224/06164	covering only portions of the surface to be connected
2224/06135	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/06165	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06136	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/06166	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/06137	with specially adapted redistribution layers [RDL]	2224/06167	with specially adapted redistribution layers [RDL]
2224/06138	being disposed in a single wiring level, i.e. planar layout	2224/06168	being disposed in a single wiring level, i.e. planar layout
2224/06139	being disposed in different wiring levels, i.e. resurf layout	2224/06169	being disposed in different wiring levels, i.e. resurf layout
2224/0614	Circular array, i.e. array with radial symmetry	2224/06177	Combinations of arrays with different layouts
2224/06141	being uniform, i.e. having a uniform pitch across the array	2224/06179	Corner adaptations, i.e. disposition of the bonding areas at the corners of the semiconductor or solid-state body
2224/06142	being non uniform, i.e. having a non uniform pitch across the array	2224/0618	being disposed on at least two different sides of the body, e.g. dual array
2224/06143	with a staggered arrangement, e.g. depopulated array	2224/06181	On opposite sides of the body
2224/06144	covering only portions of the surface to be connected	2224/06182	with specially adapted redistribution layers [RDL]
		2224/06183	On contiguous sides of the body

2224/06187		with specially adapted redistribution layers [RDL]	2224/08151		the bonding area connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/06188		being disposed in a single wiring level, i.e. planar layout	2224/08153		the body and the item being arranged next to each other, e.g. on a common substrate
2224/06189		being disposed in different wiring levels, i.e. resurf layout	2224/08155		the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/065		Material	2224/0816		the bonding area connecting to a pin of the item
2224/06505		Bonding areas having different materials	2224/08163		the bonding area connecting to a potential ring of the item
2224/0651		Function	2224/08165		the bonding area connecting to a via metallisation of the item
2224/06515		Bonding areas having different functions	2224/08167		the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/06517		including bonding areas providing primarily mechanical bonding	2224/08168		the bonding area connecting to a bonding area protruding from the surface of the item
2224/06519		including bonding areas providing primarily thermal dissipation	2224/08175		the item being metallic
2224/07	. . .	Structure, shape, material or disposition of the bonding areas after the connecting process	2224/08183		the bonding area connecting to a potential ring of the item
2224/08		of an individual bonding area	2224/08187		the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/0801		Structure	2224/08188		the bonding area connecting to a bonding area protruding from the surface of the item
2224/0805		Shape	2224/08195		the item being a discrete passive component
2224/08052		in top view	2224/08197		the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08053		being non uniform along the bonding area	2224/08198		the bonding area connecting to a bonding area protruding from the surface of the item
2224/08054		being rectangular	2224/08221		the body and the item being stacked
2224/08055		being square	2224/08225		the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/08056		being circular or elliptic	2224/0823		the bonding area connecting to a pin of the item
2224/08057		in side view	2224/08233		the bonding area connecting to a potential ring of the item
2224/08058		being non uniform along the bonding area	2224/08235		the bonding area connecting to a via metallisation of the item
2224/08059		comprising protrusions or indentations	2224/08237		the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/0807		of bonding interfaces, e.g. interlocking features	2224/08238		the bonding area connecting to a bonding area protruding from the surface of the item
2224/081		Disposition	2224/08245		the item being metallic
2224/08111		the bonding area being disposed in a recess of the surface of the body	2224/08253		the bonding area connecting to a potential ring of the item
2224/08112		the bonding area being at least partially embedded in the surface of the body			
2224/08113		the whole bonding area protruding from the surface of the body			
2224/0812		the bonding area connecting directly to another bonding area, i.e. connectorless bonding, e.g. bumpless bonding			
2224/08121		the connected bonding areas being not aligned with respect to each other			
2224/08123		the bonding area connecting directly to at least two bonding areas			
2224/08135		the bonding area connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip			
2224/08137		the bodies being arranged next to each other, e.g. on a common substrate			
2224/08145		the bodies being stacked			
2224/08146		the bonding area connecting to a via connection in the body			
2224/08147		the bonding area connecting to a bonding area disposed in a recess of the surface of the body			
2224/08148		the bonding area connecting to a bonding area protruding from the surface of the body			

2224/08257		the bonding area connecting to a bonding area disposed in a recess of the surface of the item	2224/09152		being non uniform, i.e. having a non uniform pitch across the array
2224/08258		the bonding area connecting to a bonding area protruding from the surface of the item	2224/09153		with a staggered arrangement, e.g. depopulated array
2224/08265		the item being a discrete passive component	2224/09154		covering only portions of the surface to be connected
2224/08267		the bonding area connecting to a bonding area disposed in a recess of the surface of the item	2224/09155		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/08268		the bonding area connecting to a bonding area protruding from the surface of the item	2224/09156		Covering only the central area of the surface to be connected, i.e. central arrangements
2224/085		Material	2224/0916		Random array, i.e. array with no symmetry
2224/08501		at the bonding interface	2224/09163		with a staggered arrangement
2224/08502		comprising an eutectic alloy	2224/09164		covering only portions of the surface to be connected
2224/08503		comprising an intermetallic compound	2224/09165		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/08505		outside the bonding interface	2224/09177		Combinations of arrays with different layouts
2224/08506		comprising an eutectic alloy	2224/09179		Corner adaptations, i.e. disposition of the bonding areas at the corners of the semiconductor or solid-state body
2224/09		of a plurality of bonding areas	2224/0918		being disposed on at least two different sides of the body, e.g. dual array
2224/0901		Structure	2224/09181		On opposite sides of the body
2224/0903		Bonding areas having different sizes, e.g. different diameters, heights or widths	2224/09183		On contiguous sides of the body
2224/0905		Shape	2224/095		Material
2224/09051		Bonding areas having different shapes	2224/09505		Bonding areas having different materials
2224/09055		of their bonding interfaces	2224/0951		Function
2224/091		Disposition	2224/09515		Bonding areas having different functions
2224/09102		the bonding areas being at different heights	2224/09517		including bonding areas providing primarily mechanical support
2224/09103		on the semiconductor or solid-state body	2224/09519		including bonding areas providing primarily thermal dissipation
2224/09104		outside the semiconductor or solid-state body	2224/10		Bump connectors; Manufacturing methods related thereto
2224/0912		Layout	2224/1012		Auxiliary members for bump connectors, e.g. spacers
2224/0913		Square or rectangular array	2224/10122		being formed on the semiconductor or solid-state body to be connected
2224/09132		being non uniform, i.e. having a non uniform pitch across the array	2224/10125		Reinforcing structures
2224/09133		with a staggered arrangement, e.g. depopulated array	2224/10126		Bump collar
2224/09134		covering only portions of the surface to be connected	2224/10135		Alignment aids
2224/09135		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/10145		Flow barriers
2224/0914		Circular array, i.e. array with radial symmetry	2224/10152		being formed on an item to be connected not being a semiconductor or solid-state body
2224/09142		being non uniform, i.e. having a non uniform pitch across the array	2224/10155		Reinforcing structures
2224/09143		with a staggered arrangement	2224/10156		Bump collar
2224/09144		covering only portions of the surface to be connected	2224/10165		Alignment aids
2224/09145		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/10175		Flow barriers
2224/0915		Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry	2224/11		Manufacturing methods
2224/09151		being uniform, i.e. having a uniform pitch across the array	2224/11001		Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
			2224/11002		for supporting the semiconductor or solid-state body
			2224/11003		for holding or transferring the bump preform

2224/11005		for aligning the bump connector, e.g. marks, spacers	2224/115		by chemical or physical modification of a pre-existing or pre-deposited material
2224/11009		for protecting parts during manufacture	2224/11502		Pre-existing or pre-deposited material
2224/11011		Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature	2224/11505		Sintering
2224/11013		for holding or confining the bump connector, e.g. solder flow barrier	2224/1151		Anodisation
2224/11015		for aligning the bump connector, e.g. marks, spacers	2224/11515		Curing and solidification, e.g. of a photosensitive bump material
2224/11019		for protecting parts during the process	2224/1152		Self-assembly, e.g. self-agglomeration of the bump material in a fluid
2224/111		Manufacture and pre-treatment of the bump connector preform	2224/11522		Auxiliary means therefor, e.g. for self-assembly activation
2224/1111		Shaping	2224/11524		with special adaptation of the surface or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
2224/1112		Applying permanent coating	2224/11526		involving the material of the bonding area, e.g. bonding pad or under bump metallisation [UBM]
2224/113		by local deposition of the material of the bump connector	2224/1155		Selective modification
2224/1131		in liquid form	2224/11552		using a laser or a focussed ion beam [FIB]
2224/11312		Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion	2224/11554		Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
2224/11318		by dispensing droplets	2224/116		by patterning a pre-deposited material
2224/1132		Screen printing, i.e. using a stencil	2224/11602		Mechanical treatment, e.g. polishing, grinding
2224/1133		in solid form	2224/1161		Physical or chemical etching
2224/11332		using a powder	2224/11612		by physical means only
2224/11334		using preformed bumps	2224/11614		by chemical means only
2224/1134		Stud bumping, i.e. using a wire-bonding apparatus	2224/11616		Chemical mechanical polishing [CMP]
2224/114		by blanket deposition of the material of the bump connector	2224/11618		with selective exposure, development and removal of a photosensitive bump material, e.g. of a photosensitive conductive resin
2224/1141		in liquid form	2224/1162		using masks
2224/11416		Spin coating	2224/11622		Photolithography
2224/11418		Spray coating	2224/1163		using a laser or a focused ion beam [FIB]
2224/1142		Curtain coating	2224/11632		Ablation by means of a laser or focused ion beam [FIB]
2224/11422		by dipping, e.g. in a solder bath	2224/117		involving monitoring, e.g. feedback loop
2224/11424		Immersion coating, e.g. in a solder bath	2224/118		Post-treatment of the bump connector
2224/11426		Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/1181		Cleaning, e.g. oxide removal step, desmearing
2224/11428		Wave coating	2224/1182		Applying permanent coating, e.g. in-situ coating
2224/1143		in solid form	2224/11821		Spray coating
2224/11436		Lamination of a preform, e.g. foil, sheet or layer	2224/11822		by dipping, e.g. in a solder bath
2224/11438		the preform being at least partly pre-patterned	2224/11823		Immersion coating, e.g. in a solder bath
2224/1144		by transfer printing	2224/11824		Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/11442		using a powder	2224/11825		Plating, e.g. electroplating, electroless plating
2224/11444		in gaseous form	2224/11826		Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/1145		Physical vapour deposition [PVD], e.g. evaporation, or sputtering	2224/11827		Chemical vapour deposition [CVD], e.g. laser CVD
2224/11452		Chemical vapour deposition [CVD], e.g. laser CVD	2224/1183		Reworking, e.g. shaping
2224/1146		Plating	2224/11831		involving a chemical process, e.g. etching the bump connector
2224/11462		Electroplating	2224/1184		involving a mechanical process, e.g. planarising the bump connector
2224/11464		Electroless plating	2224/11845		Chemical mechanical polishing [CMP]
2224/11466		Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface			
2224/1147		using a lift-off mask			
2224/11472		Profile of the lift-off mask			
2224/11474		Multilayer masks			
2224/1148		Permanent masks, i.e. masks left in the finished device, e.g. passivation layers			

2224/11848		Thermal treatments, e.g. annealing, controlled cooling	2224/13023		the whole bump connector protruding from the surface
2224/11849		Reflowing	2224/13024		the bump connector being disposed on a redistribution layer on the semiconductor or solid-state body
2224/119		Methods of manufacturing bump connectors involving a specific sequence of method steps	2224/13025		the bump connector being disposed on a via connection of the semiconductor or solid-state body
2224/11901		with repetition of the same manufacturing step	2224/13026		relative to the bonding area, e.g. bond pad, of the semiconductor or solid-state body
2224/11902		Multiple masking steps	2224/13027		the bump connector being offset with respect to the bonding area, e.g. bond pad
2224/11903		using different masks	2224/13028		the bump connector being disposed on at least two separate bonding areas, e.g. bond pads
2224/11906		with modification of the same mask	2224/13075		Plural core members
2224/1191		Forming a passivation layer after forming the bump connector	2224/13076		being mutually engaged together, e.g. through inserts
2224/11912		the bump being used as a mask for patterning other parts	2224/13078		being disposed next to each other, e.g. side-to-side arrangements
2224/11914		the under bump metallisation [UBM] being used as a mask for patterning other parts	2224/1308		being stacked
2224/11916		a passivation layer being used as a mask for patterning other parts	2224/13082		Two-layer arrangements
2224/12		Structure, shape, material or disposition of the bump connectors prior to the connecting process	2224/13083		Three-layer arrangements
2224/12105		Bump connectors formed on an encapsulation of the semiconductor or solid-state body, e.g. bumps on chip-scale packages	2224/13084		Four-layer arrangements
2224/13		of an individual bump connector	2224/13099		Material
2224/13001		Core members of the bump connector	2224/131		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13005		Structure	2224/13101		the principal constituent melting at a temperature of less than 400°C
2224/13006		Bump connector larger than the underlying bonding area, e.g. than the under bump metallisation [UBM]	2224/13105		Gallium [Ga] as principal constituent
2224/13007		Bump connector smaller than the underlying bonding area, e.g. than the under bump metallisation [UBM]	2224/13109		Indium [In] as principal constituent
2224/13008		Bump connector integrally formed with a redistribution layer on the semiconductor or solid-state body	2224/13111		Tin [Sn] as principal constituent
2224/13009		Bump connector integrally formed with a via connection of the semiconductor or solid-state body	2224/13113		Bismuth [Bi] as principal constituent
2224/1301		Shape	2224/13114		Thallium [Tl] as principal constituent
2224/13011		comprising apertures or cavities, e.g. hollow bump	2224/13116		Lead [Pb] as principal constituent
2224/13012		in top view	2224/13117		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13013		being rectangular or square	2224/13118		Zinc [Zn] as principal constituent
2224/13014		being circular or elliptic	2224/1312		Antimony [Sb] as principal constituent
2224/13015		comprising protrusions or indentations	2224/13123		Magnesium [Mg] as principal constituent
2224/13016		in side view	2224/13124		Aluminium [Al] as principal constituent
2224/13017		being non uniform along the bump connector	2224/13138		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13018		comprising protrusions or indentations	2224/13139		Silver [Ag] as principal constituent
2224/13019		at the bonding interface of the bump connector, i.e. on the surface of the bump connector	2224/13144		Gold [Au] as principal constituent
2224/1302		Disposition			
2224/13021		the bump connector being disposed in a recess of the surface			
2224/13022		the bump connector being at least partially embedded in the surface			

2224/13147		Copper [Cu] as principal constituent	2224/13195		with a principal constituent of the material being a gas not provided for in groups H01L 2224/131 - H01L 2224/13191
2224/13149		Manganese [Mn] as principal constituent	2224/13198		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13155		Nickel [Ni] as principal constituent	2224/13199		Material of the matrix
2224/13157		Cobalt [Co] as principal constituent	2224/132		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/1316		Iron [Fe] as principal constituent	2224/13201		the principal constituent melting at a temperature of less than 400°C
2224/13163		the principal constituent melting at a temperature of greater than 1550°C	2224/13205		Gallium [Ga] as principal constituent
2224/13164		Palladium [Pd] as principal constituent	2224/13209		Indium [In] as principal constituent
2224/13166		Titanium [Ti] as principal constituent	2224/13211		Tin [Sn] as principal constituent
2224/13169		Platinum [Pt] as principal constituent	2224/13213		Bismuth [Bi] as principal constituent
2224/1317		Zirconium [Zr] as principal constituent	2224/13214		Thallium [Tl] as principal constituent
2224/13171		Chromium [Cr] as principal constituent	2224/13216		Lead [Pb] as principal constituent
2224/13172		Vanadium [V] as principal constituent	2224/13217		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13173		Rhodium [Rh] as principal constituent	2224/13218		Zinc [Zn] as principal constituent
2224/13176		Ruthenium [Ru] as principal constituent	2224/1322		Antimony [Sb] as principal constituent
2224/13178		Iridium [Ir] as principal constituent	2224/13223		Magnesium [Mg] as principal constituent
2224/13179		Niobium [Nb] as principal constituent	2224/13224		Aluminium [Al] as principal constituent
2224/1318		Molybdenum [Mo] as principal constituent	2224/13238		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13181		Tantalum [Ta] as principal constituent	2224/13239		Silver [Ag] as principal constituent
2224/13183		Rhenium [Re] as principal constituent	2224/13244		Gold [Au] as principal constituent
2224/13184		Tungsten [W] as principal constituent	2224/13247		Copper [Cu] as principal constituent
2224/13186		with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13249		Manganese [Mn] as principal constituent
2224/13187		Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13255		Nickel [Ni] as principal constituent
2224/13188		Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13257		Cobalt [Co] as principal constituent
2224/1319		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/1326		Iron [Fe] as principal constituent
2224/13191		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene			
2224/13193		with a principal constituent of the material being a solid not provided for in groups H01L 2224/131 - H01L 2224/13191 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond			
2224/13194		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/131 - H01L 2224/13191			

2224/13263	the principal constituent melting at a temperature of greater than 1550°C	2224/133	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13264	Palladium [Pd] as principal constituent	2224/13301	the principal constituent melting at a temperature of less than 400°C
2224/13266	Titanium [Ti] as principal constituent	2224/13305	Gallium [Ga] as principal constituent
2224/13269	Platinum [Pt] as principal constituent	2224/13309	Indium [In] as principal constituent
2224/1327	Zirconium [Zr] as principal constituent	2224/13311	Tin [Sn] as principal constituent
2224/13271	Chromium [Cr] as principal constituent	2224/13313	Bismuth [Bi] as principal constituent
2224/13272	Vanadium [V] as principal constituent	2224/13314	Thallium [Tl] as principal constituent
2224/13273	Rhodium [Rh] as principal constituent	2224/13316	Lead [Pb] as principal constituent
2224/13276	Ruthenium [Ru] as principal constituent	2224/13317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13278	Iridium [Ir] as principal constituent	2224/13318	Zinc [Zn] as principal constituent
2224/13279	Niobium [Nb] as principal constituent	2224/1332	Antimony [Sb] as principal constituent
2224/1328	Molybdenum [Mo] as principal constituent	2224/13323	Magnesium [Mg] as principal constituent
2224/13281	Tantalum [Ta] as principal constituent	2224/13324	Aluminium [Al] as principal constituent
2224/13283	Rhenium [Re] as principal constituent	2224/13338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13284	Tungsten [W] as principal constituent	2224/13339	Silver [Ag] as principal constituent
2224/13286	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13344	Gold [Au] as principal constituent
2224/13287	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13347	Copper [Cu] as principal constituent
2224/13288	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13349	Manganese [Mn] as principal constituent
2224/1329	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13355	Nickel [Ni] as principal constituent
2224/13291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13357	Cobalt [Co] as principal constituent
2224/13293	with a principal constituent of the material being a solid not provided for in groups H01L 2224/132 - H01L 2224/13291 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/1336	Iron [Fe] as principal constituent
2224/13294	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/132 - H01L 2224/13291	2224/13363	the principal constituent melting at a temperature of greater than 1550°C
2224/13295	with a principal constituent of the material being a gas not provided for in groups H01L 2224/132 - H01L 2224/13291	2224/13364	Palladium [Pd] as principal constituent
2224/13298	Fillers	2224/13366	Titanium [Ti] as principal constituent
2224/13299	Base material	2224/13369	Platinum [Pt] as principal constituent
		2224/1337	Zirconium [Zr] as principal constituent

2224/13371	Chromium [Cr] as principal constituent	2224/13401	the principal constituent melting at a temperature of less than 400°C
2224/13372	Vanadium [V] as principal constituent	2224/13405	Gallium [Ga] as principal constituent
2224/13373	Rhodium [Rh] as principal constituent	2224/13409	Indium [In] as principal constituent
2224/13376	Ruthenium [Ru] as principal constituent	2224/13411	Tin [Sn] as principal constituent
2224/13378	Iridium [Ir] as principal constituent	2224/13413	Bismuth [Bi] as principal constituent
2224/13379	Niobium [Nb] as principal constituent	2224/13414	Thallium [Tl] as principal constituent
2224/1338	Molybdenum [Mo] as principal constituent	2224/13416	Lead [Pb] as principal constituent
2224/13381	Tantalum [Ta] as principal constituent	2224/13417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13383	Rhenium [Re] as principal constituent	2224/13418	Zinc [Zn] as principal constituent
2224/13384	Tungsten [W] as principal constituent	2224/1342	Antimony [Sb] as principal constituent
2224/13386	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13423	Magnesium [Mg] as principal constituent
2224/13387	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13424	Aluminium [Al] as principal constituent
2224/13388	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/1339	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13439	Silver [Ag] as principal constituent
2224/13391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13444	Gold [Au] as principal constituent
2224/13393	with a principal constituent of the material being a solid not provided for in groups H01L 2224/133 - H01L 2224/13391 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13447	Copper [Cu] as principal constituent
2224/13394	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/133 - H01L 2224/13391	2224/13449	Manganese [Mn] as principal constituent
2224/13395	with a principal constituent of the material being a gas not provided for in groups H01L 2224/133 - H01L 2224/13391	2224/13455	Nickel [Ni] as principal constituent
2224/13398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13457	Cobalt [Co] as principal constituent
2224/13399	Coating material	2224/1346	Iron [Fe] as principal constituent
2224/134	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/13463	the principal constituent melting at a temperature of greater than 1550°C
		2224/13464	Palladium [Pd] as principal constituent
		2224/13466	Titanium [Ti] as principal constituent
		2224/13469	Platinum [Pt] as principal constituent
		2224/1347	Zirconium [Zr] as principal constituent
		2224/13471	Chromium [Cr] as principal constituent
		2224/13472	Vanadium [V] as principal constituent
		2224/13473	Rhodium [Rh] as principal constituent
		2224/13476	Ruthenium [Ru] as principal constituent

2224/13478	Iridium [Ir] as principal constituent	2224/13563	Only on parts of the surface of the core, i.e. partial coating
2224/13479	Niobium [Nb] as principal constituent	2224/13564	Only on the bonding interface of the bump connector
2224/1348	Molybdenum [Mo] as principal constituent	2224/13565	Only outside the bonding interface of the bump connector
2224/13481	Tantalum [Ta] as principal constituent	2224/13566	Both on and outside the bonding interface of the bump connector
2224/13483	Rhenium [Re] as principal constituent	2224/1357	Single coating layer
2224/13484	Tungsten [W] as principal constituent	2224/13575	Plural coating layers
2224/13486	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13576	being mutually engaged together, e.g. through inserts
2224/13487	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13578	being disposed next to each other, e.g. side-to-side arrangements
2224/13488	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/1358	being stacked
2224/1349	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13582	Two-layer coating
2224/13491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13583	Three-layer coating
2224/13493	with a principal constituent of the material being a solid not provided for in groups H01L 2224/134 - H01L 2224/13491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13584	Four-layer coating
2224/13494	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/134 - H01L 2224/13491	2224/13599	Material
2224/13495	with a principal constituent of the material being a gas not provided for in groups H01L 2224/134 - H01L 2224/13491	2224/136	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13498	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13601	the principal constituent melting at a temperature of less than 400°C
2224/13499	Shape or distribution of the fillers	2224/13605	Gallium [Ga] as principal constituent
2224/1354	Coating	2224/13609	Indium [In] as principal constituent
2224/13541	Structure	2224/13611	Tin [Sn] as principal constituent
2224/1355	Shape	2224/13613	Bismuth [Bi] as principal constituent
2224/13551	being non uniform	2224/13614	Thallium [Tl] as principal constituent
2224/13552	comprising protrusions or indentations	2224/13616	Lead [Pb] as principal constituent
2224/13553	at the bonding interface of the bump connector, i.e. on the surface of the bump connector	2224/13617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/1356	Disposition	2224/13618	Zinc [Zn] as principal constituent
2224/13561	On the entire surface of the core, i.e. integral coating	2224/1362	Antimony [Sb] as principal constituent
2224/13562	On the entire exposed surface of the core	2224/13623	Magnesium [Mg] as principal constituent
		2224/13624	Aluminium [Al] as principal constituent
		2224/13638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
		2224/13639	Silver [Ag] as principal constituent
		2224/13644	Gold [Au] as principal constituent
		2224/13647	Copper [Cu] as principal constituent
		2224/13649	Manganese [Mn] as principal constituent
		2224/13655	Nickel [Ni] as principal constituent
		2224/13657	Cobalt [Co] as principal constituent
		2224/1366	Iron [Fe] as principal constituent

2224/13663	the principal constituent melting at a temperature of greater than 1550°C	2224/13699	Material of the matrix
2224/13664	Palladium [Pd] as principal constituent	2224/137	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13666	Titanium [Ti] as principal constituent	2224/13701	the principal constituent melting at a temperature of less than 400°C
2224/13669	Platinum [Pt] as principal constituent	2224/13705	Gallium [Ga] as principal constituent
2224/1367	Zirconium [Zr] as principal constituent	2224/13709	Indium [In] as principal constituent
2224/13671	Chromium [Cr] as principal constituent	2224/13711	Tin [Sn] as principal constituent
2224/13672	Vanadium [V] as principal constituent	2224/13713	Bismuth [Bi] as principal constituent
2224/13673	Rhodium [Rh] as principal constituent	2224/13714	Thallium [Tl] as principal constituent
2224/13676	Ruthenium [Ru] as principal constituent	2224/13716	Lead [Pb] as principal constituent
2224/13678	Iridium [Ir] as principal constituent	2224/13717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13679	Niobium [Nb] as principal constituent	2224/13718	Zinc [Zn] as principal constituent
2224/1368	Molybdenum [Mo] as principal constituent	2224/1372	Antimony [Sb] as principal constituent
2224/13681	Tantalum [Ta] as principal constituent	2224/13723	Magnesium [Mg] as principal constituent
2224/13683	Rhenium [Re] as principal constituent	2224/13724	Aluminium [Al] as principal constituent
2224/13684	Tungsten [W] as principal constituent	2224/13738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13739	Silver [Ag] as principal constituent
2224/13687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13744	Gold [Au] as principal constituent
2224/13688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13747	Copper [Cu] as principal constituent
2224/1369	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13749	Manganese [Mn] as principal constituent
2224/13691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13755	Nickel [Ni] as principal constituent
2224/13693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/136 - H01L 2224/13691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13757	Cobalt [Co] as principal constituent
2224/13694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/136 - H01L 2224/13691	2224/1376	Iron [Fe] as principal constituent
2224/13695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/136 - H01L 2224/13691	2224/13763	the principal constituent melting at a temperature of greater than 1550°C
2224/13698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13764	Palladium [Pd] as principal constituent
		2224/13766	Titanium [Ti] as principal constituent
		2224/13769	Platinum [Pt] as principal constituent
		2224/1377	Zirconium [Zr] as principal constituent

2224/13771	Chromium [Cr] as principal constituent	2224/13811	Tin [Sn] as principal constituent
2224/13772	Vanadium [V] as principal constituent	2224/13813	Bismuth [Bi] as principal constituent
2224/13773	Rhodium [Rh] as principal constituent	2224/13814	Thallium [Tl] as principal constituent
2224/13776	Ruthenium [Ru] as principal constituent	2224/13816	Lead [Pb] as principal constituent
2224/13778	Iridium [Ir] as principal constituent	2224/13817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13779	Niobium [Nb] as principal constituent	2224/13818	Zinc [Zn] as principal constituent
2224/1378	Molybdenum [Mo] as principal constituent	2224/1382	Antimony [Sb] as principal constituent
2224/13781	Tantalum [Ta] as principal constituent	2224/13823	Magnesium [Mg] as principal constituent
2224/13783	Rhenium [Re] as principal constituent	2224/13824	Aluminium [Al] as principal constituent
2224/13784	Tungsten [W] as principal constituent	2224/13838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13839	Silver [Ag] as principal constituent
2224/13787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13844	Gold [Au] as principal constituent
2224/13788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13847	Copper [Cu] as principal constituent
2224/1379	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13849	Manganese [Mn] as principal constituent
2224/13791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13855	Nickel [Ni] as principal constituent
2224/13793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/137 - H01L 2224/13791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13857	Cobalt [Co] as principal constituent
2224/13794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/137 - H01L 2224/13791	2224/1386	Iron [Fe] as principal constituent
2224/13795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/137 - H01L 2224/13791	2224/13863	the principal constituent melting at a temperature of greater than 1550°C
2224/13798	Fillers	2224/13864	Palladium [Pd] as principal constituent
2224/13799	Base material	2224/13866	Titanium [Ti] as principal constituent
2224/138	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/13869	Platinum [Pt] as principal constituent
2224/13801	the principal constituent melting at a temperature of less than 400°C	2224/1387	Zirconium [Zr] as principal constituent
2224/13805	Gallium [Ga] as principal constituent	2224/13871	Chromium [Cr] as principal constituent
2224/13809	Indium [In] as principal constituent	2224/13872	Vanadium [V] as principal constituent
		2224/13873	Rhodium [Rh] as principal constituent
		2224/13876	Ruthenium [Ru] as principal constituent
		2224/13878	Iridium [Ir] as principal constituent
		2224/13879	Niobium [Nb] as principal constituent
		2224/1388	Molybdenum [Mo] as principal constituent

2224/13881	Tantalum [Ta] as principal constituent	2224/13916	Lead [Pb] as principal constituent
2224/13883	Rhenium [Re] as principal constituent	2224/13917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13884	Tungsten [W] as principal constituent	2224/13918	Zinc [Zn] as principal constituent
2224/13886	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/1392	Antimony [Sb] as principal constituent
2224/13887	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13923	Magnesium [Mg] as principal constituent
2224/13888	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13924	Aluminium [Al] as principal constituent
2224/1389	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13939	Silver [Ag] as principal constituent
2224/13893	with a principal constituent of the material being a solid not provided for in groups H01L 2224/138 - H01L 2224/13891	2224/13944	Gold [Au] as principal constituent
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13947	Copper [Cu] as principal constituent
2224/13894	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/138 - H01L 2224/13891	2224/13949	Manganese [Mn] as principal constituent
		2224/13955	Nickel [Ni] as principal constituent
2224/13895	with a principal constituent of the material being a gas not provided for in groups H01L 2224/138 - H01L 2224/13891	2224/13957	Cobalt [Co] as principal constituent
		2224/1396	Iron [Fe] as principal constituent
2224/13898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13963	the principal constituent melting at a temperature of greater than 1550°C
2224/13899	Coating material	2224/13964	Palladium [Pd] as principal constituent
2224/139	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/13966	Titanium [Ti] as principal constituent
2224/13901	the principal constituent melting at a temperature of less than 400°C	2224/13969	Platinum [Pt] as principal constituent
2224/13905	Gallium [Ga] as principal constituent	2224/1397	Zirconium [Zr] as principal constituent
2224/13909	Indium [In] as principal constituent	2224/13971	Chromium [Cr] as principal constituent
2224/13911	Tin [Sn] as principal constituent	2224/13972	Vanadium [V] as principal constituent
2224/13913	Bismuth [Bi] as principal constituent	2224/13973	Rhodium [Rh] as principal constituent
2224/13914	Thallium [Tl] as principal constituent	2224/13976	Ruthenium [Ru] as principal constituent
		2224/13978	Iridium [Ir] as principal constituent
		2224/13979	Niobium [Nb] as principal constituent
		2224/1398	Molybdenum [Mo] as principal constituent
		2224/13981	Tantalum [Ta] as principal constituent
		2224/13983	Rhenium [Re] as principal constituent
		2224/13984	Tungsten [W] as principal constituent

2224/13986	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/14136	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/13987	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/1414	Circular array, i.e. array with radial symmetry
2224/13988	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/14141	being uniform, i.e. having a uniform pitch across the array
2224/1399	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/14142	being non uniform, i.e. having a non uniform pitch across the array
2224/13991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/14143	with a staggered arrangement, e.g. depopulated array
2224/13993	with a principal constituent of the material being a solid not provided for in groups H01L 2224/139 - H01L 2224/13991 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/14144	covering only portions of the surface to be connected
2224/13994	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/139 - H01L 2224/13991	2224/14145	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/13995	with a principal constituent of the material being a gas not provided for in groups H01L 2224/139 - H01L 2224/13991	2224/14146	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/13998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/1415	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/13999	Shape or distribution of the fillers	2224/14151	being uniform, i.e. having a uniform pitch across the array
2224/14	of a plurality of bump connectors	2224/14152	being non uniform, i.e. having a non uniform pitch across the array
2224/1401	Structure	2224/14153	with a staggered arrangement, e.g. depopulated array
2224/1403	Bump connectors having different sizes, e.g. different diameters, heights or widths	2224/14154	covering only portions of the surface to be connected
2224/1405	Shape	2224/14155	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/14051	Bump connectors having different shapes	2224/14156	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/141	Disposition	2224/1416	Random layout, i.e. layout with no symmetry
2224/14104	relative to the bonding areas, e.g. bond pads, of the semiconductor or solid-state body	2224/14163	with a staggered arrangement
2224/1411	the bump connectors being bonded to at least one common bonding area	2224/14164	covering only portions of the surface to be connected
2224/1412	Layout	2224/14165	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/1413	Square or rectangular array	2224/14166	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/14131	being uniform, i.e. having a uniform pitch across the array	2224/14177	Combinations of arrays with different layouts
2224/14132	being non uniform, i.e. having a non uniform pitch across the array	2224/14179	Corner adaptations, i.e. disposition of the bump connectors at the corners of the semiconductor or solid-state body
2224/14133	with a staggered arrangement, e.g. depopulated array	2224/1418	being disposed on at least two different sides of the body, e.g. dual array
2224/14134	covering only portions of the surface to be connected	2224/14181	On opposite sides of the body
2224/14135	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/14183	On contiguous sides of the body
		2224/145	Material
		2224/14505	Bump connectors having different materials
		2224/1451	Function
		2224/14515	Bump connectors having different functions
		2224/14517	including bump connectors providing primarily mechanical bonding

2224/14519		including bump connectors providing primarily thermal dissipation	2224/16151		the bump connector connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/15	. . .	Structure, shape, material or disposition of the bump connectors after the connecting process	2224/16153		the body and the item being arranged next to each other, e.g. on a common substrate
2224/16		of an individual bump connector	2224/16155		the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/1601		Structure	2224/16157		the bump connector connecting to a bond pad of the item
2224/16012		relative to the bonding area, e.g. bond pad	2224/1616		the bump connector connecting to a pin of the item
2224/16013		the bump connector being larger than the bonding area, e.g. bond pad	2224/16163		the bump connector connecting to a potential ring of the item
2224/16014		the bump connector being smaller than the bonding area, e.g. bond pad	2224/16165		the bump connector connecting to a via metallisation of the item
2224/1605		Shape	2224/16167		the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16052		in top view	2224/16168		the bump connector connecting to a bonding area protruding from the surface of the item
2224/16054		being rectangular or square	2224/16175		the item being metallic
2224/16055		being circular or elliptic	2224/16183		the bump connector connecting to a potential ring of the item
2224/16056		comprising protrusions or indentations	2224/16187		the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16057		in side view	2224/16188		the bump connector connecting to a bonding area protruding from the surface of the item
2224/16058		being non uniform along the bump connector	2224/16195		the item being a discrete passive component
2224/16059		comprising protrusions or indentations	2224/16197		the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/1607		of bonding interfaces, e.g. interlocking features	2224/16198		the bump connector connecting to a bonding area protruding from the surface of the item
2224/161		Disposition	2224/16221		the body and the item being stacked
2224/16104		relative to the bonding area, e.g. bond pad	2224/16225		the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/16105		the bump connector connecting bonding areas being not aligned with respect to each other	2224/16227		the bump connector connecting to a bond pad of the item
2224/16106		the bump connector connecting one bonding area to at least two respective bonding areas	2224/1623		the bump connector connecting to a pin of the item
2224/16108		the bump connector not being orthogonal to the surface	2224/16233		the bump connector connecting to a potential ring of the item
2224/16111		the bump connector being disposed in a recess of the surface	2224/16235		the bump connector connecting to a via metallisation of the item
2224/16112		the bump connector being at least partially embedded in the surface	2224/16237		the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16113		the whole bump connector protruding from the surface	2224/16238		the bump connector connecting to a bonding area protruding from the surface of the item
2224/1613		the bump connector connecting within a semiconductor or solid-state body, i.e. connecting two bonding areas on the same semiconductor or solid-state body	2224/1624		the bump connector connecting between the body and an opposite side of the item with respect to the body
2224/16135		the bump connector connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/16245		the item being metallic
2224/16137		the bodies being arranged next to each other, e.g. on a common substrate			
2224/16141		the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements			
2224/16145		the bodies being stacked			
2224/16146		the bump connector connecting to a via connection in the semiconductor or solid-state body			
2224/16147		the bump connector connecting to a bonding area disposed in a recess of the surface			
2224/16148		the bump connector connecting to a bonding area protruding from the surface			

2224/16253		the bump connector connecting to a potential ring of the item	2224/17143		with a staggered arrangement
2224/16257		the bump connector connecting to a bonding area disposed in a recess of the surface of the item	2224/17144		covering only portions of the surface to be connected
2224/16258		the bump connector connecting to a bonding area protruding from the surface of the item	2224/17145		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/1626		the bump connector connecting between the body and an opposite side of the item with respect to the body	2224/17146		Covering only the central area of the surface to be connected, i.e. central arrangements
2224/16265		the item being a discrete passive component	2224/1715		Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/16267		the bump connector connecting to a bonding area disposed in a recess of the surface of the item	2224/17151		being uniform, i.e. having a uniform pitch across the array
2224/16268		the bump connector connecting to a bonding area protruding from the surface of the item	2224/17152		being non uniform, i.e. having a non uniform pitch across the array
2224/165		Material	2224/17153		with a staggered arrangement, e.g. depopulated array
2224/16501		at the bonding interface	2224/17154		covering only portions of the surface to be connected
2224/16502		comprising an eutectic alloy	2224/17155		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/16503		comprising an intermetallic compound	2224/17156		Covering only the central area of the surface to be connected, i.e. central arrangements
2224/16505		outside the bonding interface, e.g. in the bulk of the bump connector	2224/1716		Random layout, i.e. layout with no symmetry
2224/16506		comprising an eutectic alloy	2224/17163		with a staggered arrangement
2224/16507		comprising an intermetallic compound	2224/17164		covering only portions of the surface to be connected
2224/17		of a plurality of bump connectors	2224/17165		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/1701		Structure	2224/17166		Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1703		Bump connectors having different sizes, e.g. different diameters, heights or widths	2224/17177		Combinations of arrays with different layouts
2224/1705		Shape	2224/17179		Corner adaptations, i.e. disposition of the bump connectors at the corners of the semiconductor or solid-state body
2224/17051		Bump connectors having different shapes	2224/1718		being disposed on at least two different sides of the body, e.g. dual array
2224/17055		of their bonding interfaces	2224/17181		On opposite sides of the body
2224/171		Disposition	2224/17183		On contiguous sides of the body
2224/17104		relative to the bonding areas, e.g. bond pads	2224/175		Material
2224/17106		the bump connectors being bonded to at least one common bonding area	2224/17505		Bump connectors having different materials
2224/17107		the bump connectors connecting two common bonding areas	2224/1751		Function
2224/1712		Layout	2224/17515		Bump connectors having different functions
2224/1713		Square or rectangular array	2224/17517		including bump connectors providing primarily mechanical support
2224/17132		being non uniform, i.e. having a non uniform pitch across the array	2224/17519		including bump connectors providing primarily thermal dissipation
2224/17133		with a staggered arrangement, e.g. depopulated array	2224/18		High density interconnect [HDI] connectors; Manufacturing methods related thereto
2224/17134		covering only portions of the surface to be connected	2224/19		Manufacturing methods of high density interconnect preforms
2224/17135		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/20		Structure, shape, material or disposition of high density interconnect preforms
2224/17136		Covering only the central area of the surface to be connected, i.e. central arrangements	2224/21		of an individual HDI interconnect
2224/1714		Circular array, i.e. array with radial symmetry	2224/2101		Structure
2224/17142		being non uniform, i.e. having a non uniform pitch across the array			

2224/2105		Shape	2224/24175		the item being metallic
2224/211		Disposition	2224/24195		the item being a discrete passive component
2224/214		Connecting portions	2224/24221		the body and the item being stacked
2224/215		Material	2224/24225		the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/22		of a plurality of HDI interconnects	2224/24226		the HDI interconnect connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the item being planar
2224/2201		Structure	2224/24227		the HDI interconnect not connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the semiconductor or solid-state body being mounted in a cavity or on a protrusion of the item
2224/2205		Shape	2224/24245		the item being metallic
2224/221		Disposition	2224/24246		the HDI interconnect connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the item being planar
2224/224		Connecting portions	2224/24247		the HDI interconnect not connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the semiconductor or solid-state body being mounted in a cavity or on a protrusion of the item
2224/225		Material	2224/24265		the item being a discrete passive component
2224/22505		HDI interconnects having different materials	2224/244		Connecting portions
2224/23		Structure, shape, material or disposition of the high density interconnect connectors after the connecting process	2224/245		Material
2224/24		of an individual high density interconnect connector	2224/2499		Auxiliary members for HDI interconnects, e.g. spacers, alignment aids
2224/2401		Structure	2224/24991		being formed on the semiconductor or solid-state body to be connected
2224/24011		Deposited, e.g. MCM-D type	2224/24992		Flow barrier
2224/2402		Laminated, e.g. MCM-L type	2224/24996		being formed on an item to be connected not being a semiconductor or solid-state body
2224/2405		Shape	2224/24997		Flow barrier
2224/24051		Conformal with the semiconductor or solid-state device	2224/24998		Reinforcing structures, e.g. ramp-like support
2224/241		Disposition	2224/25		of a plurality of high density interconnect connectors
2224/24101		Connecting bonding areas at the same height	2224/2501		Structure
2224/24105		Connecting bonding areas at different heights	2224/2505		Shape
2224/2413		Connecting within a semiconductor or solid-state body	2224/251		Disposition
2224/24135		Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/25105		Connecting at different heights
2224/24137		the bodies being arranged next to each other, e.g. on a common substrate	2224/2511		the connectors being bonded to at least one common bonding area
2224/24141		the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements	2224/25111		the connectors connecting two common bonding areas
2224/24145		the bodies being stacked	2224/25112		the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body
2224/24146		the HDI interconnect connecting to the same level of the lower semiconductor or solid-state body at which the upper semiconductor or solid-state body is mounted			
2224/24147		the HDI interconnect not connecting to the same level of the lower semiconductor or solid-state body at which the upper semiconductor or solid-state body is mounted, e.g. the upper semiconductor or solid-state body being mounted in a cavity or on a protrusion of the lower semiconductor or solid-state body			
2224/24151		Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive			
2224/24153		the body and the item being arranged next to each other, e.g. on a common substrate			
2224/24155		the item being non-metallic, e.g. insulating substrate with or without metallisation			

2224/25113		the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body	2224/2733		in solid form
2224/2512		Layout	2224/27332		using a powder
2224/25171		Fan-out arrangements	2224/27334		using preformed layer
2224/25174		Stacked arrangements	2224/274		by blanket deposition of the material of the layer connector
2224/25175		Parallel arrangements	2224/2741		in liquid form
2224/25177		Combinations of a plurality of arrangements	2224/27416		Spin coating
2224/2518		being disposed on at least two different sides of the body, e.g. dual array	2224/27418		Spray coating
2224/254		Connecting portions	2224/2742		Curtain coating
2224/2541		the connecting portions being stacked	2224/27422		by dipping, e.g. in a solder bath
2224/2543		the connecting portions being staggered	2224/27424		Immersion coating, e.g. in a solder bath
2224/255		Material	2224/27426		Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/26	. .	Layer connectors, e.g. plate connectors, solder or adhesive layers; Manufacturing methods related thereto	2224/27428		Wave coating
2224/2612	. . .	Auxiliary members for layer connectors, e.g. spacers	2224/2743		in solid form
2224/26122		being formed on the semiconductor or solid-state body to be connected	2224/27436		Lamination of a preform, e.g. foil, sheet or layer
2224/26125		Reinforcing structures	2224/27438		the preform being at least partly pre-patterned
2224/26135		Alignment aids	2224/2744		by transfer printing
2224/26145		Flow barriers	2224/27442		using a powder
2224/26152		being formed on an item to be connected not being a semiconductor or solid-state body	2224/27444		in gaseous form
2224/26155		Reinforcing structures	2224/2745		Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/26165		Alignment aids	2224/27452		Chemical vapour deposition [CVD], e.g. laser CVD
2224/26175		Flow barriers	2224/2746		Plating
2224/27	. . .	Manufacturing methods	2224/27462		Electroplating
2224/27001		Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate	2224/27464		Electroless plating
2224/27002		for supporting the semiconductor or solid-state body	2224/27466		Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
2224/27003		for holding or transferring the layer preform	2224/2747		using a lift-off mask
2224/27005		for aligning the layer connector, e.g. marks, spacers	2224/27472		Profile of the lift-off mask
2224/27009		for protecting parts during manufacture	2224/27474		Multilayer masks
2224/27011		Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature	2224/2748		Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
2224/27013		for holding or confining the layer connector, e.g. solder flow barrier	2224/275		by chemical or physical modification of a pre-existing or pre-deposited material
2224/27015		for aligning the layer connector, e.g. marks, spacers	2224/27502		Pre-existing or pre-deposited material
2224/27019		for protecting parts during the process	2224/27505		Sintering
2224/271		Manufacture and pre-treatment of the layer connector preform	2224/2751		Anodisation
2224/2711		Shaping	2224/27515		Curing and solidification, e.g. of a photosensitive layer material
2224/2712		Applying permanent coating	2224/2752		Self-assembly, e.g. self-agglomeration of the layer material in a fluid
2224/273		by local deposition of the material of the layer connector	2224/27522		Auxiliary means therefor, e.g. for self-assembly activation
2224/2731		in liquid form	2224/27524		with special adaptation of the surface or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
2224/27312		Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion	2224/27526		involving the material of the bonding area, e.g. bonding pad
2224/27318		by dispensing droplets	2224/2755		Selective modification
2224/2732		Screen printing, i.e. using a stencil	2224/27552		using a laser or a focussed ion beam [FIB]
			2224/27554		Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
			2224/276		by patterning a pre-deposited material
			2224/27602		Mechanical treatment, e.g. polishing, grinding

2224/2761		Physical or chemical etching	2224/29007		Layer connector smaller than the underlying bonding area
2224/27612		by physical means only	2224/29008		Layer connector integrally formed with a redistribution layer on the semiconductor or solid-state body
2224/27614		by chemical means only	2224/29009		Layer connector integrally formed with a via connection of the semiconductor or solid-state body
2224/27616		Chemical mechanical polishing [CMP]	2224/2901		Shape
2224/27618		with selective exposure, development and removal of a photosensitive layer material, e.g. of a photosensitive conductive resin	2224/29011		comprising apertures or cavities
2224/2762		using masks	2224/29012		in top view
2224/27622		Photolithography	2224/29013		being rectangular or square
2224/2763		using a laser or a focused ion beam [FIB]	2224/29014		being circular or elliptic
2224/27632		Ablation by means of a laser or focused ion beam [FIB]	2224/29015		comprising protrusions or indentations
2224/277		involving monitoring, e.g. feedback loop	2224/29016		in side view
2224/278		Post-treatment of the layer connector	2224/29017		being non uniform along the layer connector
2224/2781		Cleaning, e.g. oxide removal step, desmearing	2224/29018		comprising protrusions or indentations
2224/2782		Applying permanent coating, e.g. in-situ coating	2224/29019		at the bonding interface of the layer connector, i.e. on the surface of the layer connector
2224/27821		Spray coating	2224/2902		Disposition
2224/27822		by dipping, e.g. in a solder bath	2224/29021		the layer connector being disposed in a recess of the surface
2224/27823		Immersion coating, e.g. in a solder bath	2224/29022		the layer connector being at least partially embedded in the surface
2224/27824		Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/29023		the whole layer connector protruding from the surface
2224/27825		Plating, e.g. electroplating, electroless plating	2224/29024		the layer connector being disposed on a redistribution layer on the semiconductor or solid-state body
2224/27826		Physical vapour deposition [PVD], e.g. evaporation, or sputtering	2224/29025		the layer connector being disposed on a via connection of the semiconductor or solid-state body
2224/27827		Chemical vapour deposition [CVD], e.g. laser CVD	2224/29026		relative to the bonding area, e.g. bond pad, of the semiconductor or solid-state body
2224/2783		Reworking, e.g. shaping	2224/29027		the layer connector being offset with respect to the bonding area, e.g. bond pad
2224/27831		involving a chemical process, e.g. etching the layer connector	2224/29028		the layer connector being disposed on at least two separate bonding areas, e.g. bond pads
2224/2784		involving a mechanical process, e.g. planarising the layer connector	2224/29034		the layer connector covering only portions of the surface to be connected
2224/27845		Chemical mechanical polishing [CMP]	2224/29035		covering only the peripheral area of the surface to be connected
2224/27848		Thermal treatments, e.g. annealing, controlled cooling	2224/29036		covering only the central area of the surface to be connected
2224/27849		Reflowing	2224/29075		Plural core members
2224/279		Methods of manufacturing layer connectors involving a specific sequence of method steps	2224/29076		being mutually engaged together, e.g. through inserts
2224/27901		with repetition of the same manufacturing step	2224/29078		being disposed next to each other, e.g. side-to-side arrangements
2224/27902		Multiple masking steps	2224/2908		being stacked
2224/27903		using different masks	2224/29082		Two-layer arrangements
2224/27906		with modification of the same mask	2224/29083		Three-layer arrangements
2224/2791		Forming a passivation layer after forming the layer connector	2224/29084		Four-layer arrangements
2224/27912		the layer being used as a mask for patterning other parts	2224/29099		Material
2224/27916		a passivation layer being used as a mask for patterning other parts			
2224/28		Structure, shape, material or disposition of the layer connectors prior to the connecting process			
2224/28105		Layer connectors formed on an encapsulation of the semiconductor or solid-state body, e.g. layer connectors on chip-scale packages			
2224/29		of an individual layer connector			
2224/29001		Core members of the layer connector			
2224/29005		Structure			
2224/29006		Layer connector larger than the underlying bonding area			

2224/291		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/29178		Iridium [Ir] as principal constituent
2224/29101		the principal constituent melting at a temperature of less than 400°C	2224/29179		Niobium [Nb] as principal constituent
2224/29105		Gallium [Ga] as principal constituent	2224/2918		Molybdenum [Mo] as principal constituent
2224/29109		Indium [In] as principal constituent	2224/29181		Tantalum [Ta] as principal constituent
2224/29111		Tin [Sn] as principal constituent	2224/29183		Rhenium [Re] as principal constituent
2224/29113		Bismuth [Bi] as principal constituent	2224/29184		Tungsten [W] as principal constituent
2224/29114		Thallium [Tl] as principal constituent	2224/29186		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29116		Lead [Pb] as principal constituent	2224/29187		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/29117		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/29188		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/29118		Zinc [Zn] as principal constituent	2224/2919		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/2912		Antimony [Sb] as principal constituent	2224/29191		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29123		Magnesium [Mg] as principal constituent	2224/29193		with a principal constituent of the material being a solid not provided for in groups H01L 2224/291 - H01L 2224/29191 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29124		Aluminium [Al] as principal constituent	2224/29194		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/291 - H01L 2224/29191
2224/29138		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29195		with a principal constituent of the material being a gas not provided for in groups H01L 2224/291 - H01L 2224/29191
2224/29139		Silver [Ag] as principal constituent	2224/29198		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29144		Gold [Au] as principal constituent	2224/29199		Material of the matrix
2224/29147		Copper [Cu] as principal constituent	2224/292		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29149		Manganese [Mn] as principal constituent	2224/29201		the principal constituent melting at a temperature of less than 400°C
2224/29155		Nickel [Ni] as principal constituent	2224/29205		Gallium [Ga] as principal constituent
2224/29157		Cobalt [Co] as principal constituent	2224/29209		Indium [In] as principal constituent
2224/2916		Iron [Fe] as principal constituent	2224/29211		Tin [Sn] as principal constituent
2224/29163		the principal constituent melting at a temperature of greater than 1550°C	2224/29213		Bismuth [Bi] as principal constituent
2224/29164		Palladium [Pd] as principal constituent			
2224/29166		Titanium [Ti] as principal constituent			
2224/29169		Platinum [Pt] as principal constituent			
2224/2917		Zirconium [Zr] as principal constituent			
2224/29171		Chromium [Cr] as principal constituent			
2224/29172		Vanadium [V] as principal constituent			
2224/29173		Rhodium [Rh] as principal constituent			
2224/29176		Ruthenium [Ru] as principal constituent			

2224/29214	Thallium [Tl] as principal constituent	2224/29284	Tungsten [W] as principal constituent
2224/29216	Lead [Pb] as principal constituent	2224/29286	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29217	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/29287	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/29218	Zinc [Zn] as principal constituent	2224/29288	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/29222	Antimony [Sb] as principal constituent	2224/2929	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29223	Magnesium [Mg] as principal constituent	2224/29291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29224	Aluminium [Al] as principal constituent	2224/29293	with a principal constituent of the material being a solid not provided for in groups H01L 2224/292 - H01L 2224/29291 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29238	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29294	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/292 - H01L 2224/29291
2224/29239	Silver [Ag] as principal constituent	2224/29295	with a principal constituent of the material being a gas not provided for in groups H01L 2224/292 - H01L 2224/29291
2224/29244	Gold [Au] as principal constituent	2224/29298	Fillers
2224/29247	Copper [Cu] as principal constituent	2224/29299	Base material
2224/29249	Manganese [Mn] as principal constituent	2224/293	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29255	Nickel [Ni] as principal constituent	2224/29301	the principal constituent melting at a temperature of less than 400°C
2224/29257	Cobalt [Co] as principal constituent	2224/29305	Gallium [Ga] as principal constituent
2224/2926	Iron [Fe] as principal constituent	2224/29309	Indium [In] as principal constituent
2224/29263	the principal constituent melting at a temperature of greater than 1550°C	2224/29311	Tin [Sn] as principal constituent
2224/29264	Palladium [Pd] as principal constituent	2224/29313	Bismuth [Bi] as principal constituent
2224/29266	Titanium [Ti] as principal constituent	2224/29314	Thallium [Tl] as principal constituent
2224/29269	Platinum [Pt] as principal constituent	2224/29316	Lead [Pb] as principal constituent
2224/2927	Zirconium [Zr] as principal constituent	2224/29317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29271	Chromium [Cr] as principal constituent	2224/29318	Zinc [Zn] as principal constituent
2224/29272	Vanadium [V] as principal constituent	2224/2932	Antimony [Sb] as principal constituent
2224/29273	Rhodium [Rh] as principal constituent	2224/29323	Magnesium [Mg] as principal constituent
2224/29276	Ruthenium [Ru] as principal constituent		
2224/29278	Iridium [Ir] as principal constituent		
2224/29279	Niobium [Nb] as principal constituent		
2224/2928	Molybdenum [Mo] as principal constituent		
2224/29281	Tantalum [Ta] as principal constituent		
2224/29283	Rhenium [Re] as principal constituent		

2224/29324	Aluminium [Al] as principal constituent	2224/29391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29393	with a principal constituent of the material being a solid not provided for in groups H01L 2224/293 - H01L 2224/29391 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29339	Silver [Ag] as principal constituent	2224/29394	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/293 - H01L 2224/29391
2224/29344	Gold [Au] as principal constituent	2224/29395	with a principal constituent of the material being a gas not provided for in groups H01L 2224/293 - H01L 2224/29391
2224/29347	Copper [Cu] as principal constituent	2224/29398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29349	Manganese [Mn] as principal constituent	2224/29399	Coating material
2224/29355	Nickel [Ni] as principal constituent	2224/294	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29357	Cobalt [Co] as principal constituent	2224/29401	the principal constituent melting at a temperature of less than 400°C
2224/2936	Iron [Fe] as principal constituent	2224/29405	Gallium [Ga] as principal constituent
2224/29363	the principal constituent melting at a temperature of greater than 1550°C	2224/29409	Indium [In] as principal constituent
2224/29364	Palladium [Pd] as principal constituent	2224/29411	Tin [Sn] as principal constituent
2224/29366	Titanium [Ti] as principal constituent	2224/29413	Bismuth [Bi] as principal constituent
2224/29369	Platinum [Pt] as principal constituent	2224/29414	Thallium [Tl] as principal constituent
2224/2937	Zirconium [Zr] as principal constituent	2224/29416	Lead [Pb] as principal constituent
2224/29371	Chromium [Cr] as principal constituent	2224/29417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29372	Vanadium [V] as principal constituent	2224/29418	Zinc [Zn] as principal constituent
2224/29373	Rhodium [Rh] as principal constituent	2224/2942	Antimony [Sb] as principal constituent
2224/29376	Ruthenium [Ru] as principal constituent	2224/29423	Magnesium [Mg] as principal constituent
2224/29378	Iridium [Ir] as principal constituent	2224/29424	Aluminium [Al] as principal constituent
2224/29379	Niobium [Nb] as principal constituent	2224/29438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/2938	Molybdenum [Mo] as principal constituent		
2224/29381	Tantalum [Ta] as principal constituent		
2224/29383	Rhenium [Re] as principal constituent		
2224/29384	Tungsten [W] as principal constituent		
2224/29386	with a principal constituent of the material being a non metallic, non metalloid inorganic material		
2224/29387	Ceramics, e.g. crystalline carbides, nitrides or oxides		
2224/29388	Glasses, e.g. amorphous oxides, nitrides or fluorides		
2224/2939	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		

2224/29439	...	Silver [Ag] as principal constituent	2224/29493	...	with a principal constituent of the material being a solid not provided for in groups H01L 2224/294 - H01L 2224/29491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29444	...	Gold [Au] as principal constituent	2224/29494	...	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/294 - H01L 2224/29491
2224/29447	...	Copper [Cu] as principal constituent	2224/29495	...	with a principal constituent of the material being a gas not provided for in groups H01L 2224/294 - H01L 2224/29491
2224/29449	...	Manganese [Mn] as principal constituent	2224/29498	...	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29455	...	Nickel [Ni] as principal constituent	2224/29499	...	Shape or distribution of the fillers
2224/29457	...	Cobalt [Co] as principal constituent	2224/2954	...	Coating
2224/2946	...	Iron [Fe] as principal constituent	2224/29541	...	Structure
2224/29463	...	the principal constituent melting at a temperature of greater than 1550°C	2224/2955	...	Shape
2224/29464	...	Palladium [Pd] as principal constituent	2224/29551	...	being non uniform
2224/29466	...	Titanium [Ti] as principal constituent	2224/29552	...	comprising protrusions or indentations
2224/29469	...	Platinum [Pt] as principal constituent	2224/29553	...	at the bonding interface of the layer connector, i.e. on the surface of the layer connector
2224/2947	...	Zirconium [Zr] as principal constituent	2224/2956	...	Disposition
2224/29471	...	Chromium [Cr] as principal constituent	2224/29561	...	On the entire surface of the core, i.e. integral coating
2224/29472	...	Vanadium [V] as principal constituent	2224/29562	...	On the entire exposed surface of the core
2224/29473	...	Rhodium [Rh] as principal constituent	2224/29563	...	Only on parts of the surface of the core, i.e. partial coating
2224/29476	...	Ruthenium [Ru] as principal constituent	2224/29564	...	Only on the bonding interface of the layer connector
2224/29478	...	Iridium [Ir] as principal constituent	2224/29565	...	Only outside the bonding interface of the layer connector
2224/29479	...	Niobium [Nb] as principal constituent	2224/29566	...	Both on and outside the bonding interface of the layer connector
2224/2948	...	Molybdenum [Mo] as principal constituent	2224/2957	...	Single coating layer
2224/29481	...	Tantalum [Ta] as principal constituent	2224/29575	...	Plural coating layers
2224/29483	...	Rhenium [Re] as principal constituent	2224/29576	...	being mutually engaged together, e.g. through inserts
2224/29484	...	Tungsten [W] as principal constituent	2224/29578	...	being disposed next to each other, e.g. side-to-side arrangements
2224/29486	...	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/2958	...	being stacked
2224/29487	...	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/29582	...	Two-layer coating
2224/29488	...	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/29583	...	Three-layer coating
2224/2949	...	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/29584	...	Four-layer coating
2224/29491	...	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/29599	...	Material
			2224/296	...	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
			2224/29601	...	the principal constituent melting at a temperature of less than 400°C

2224/29605		Gallium [Ga] as principal constituent	2224/29683		Rhenium [Re] as principal constituent
2224/29609		Indium [In] as principal constituent	2224/29684		Tungsten [W] as principal constituent
2224/29611		Tin [Sn] as principal constituent	2224/29686		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29613		Bismuth [Bi] as principal constituent	2224/29687		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/29614		Thallium [Tl] as principal constituent	2224/29688		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/29616		Lead [Pb] as principal constituent	2224/2969		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29617		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/29691		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29618		Zinc [Zn] as principal constituent	2224/29693		with a principal constituent of the material being a solid not provided for in groups H01L 2224/296 - H01L 2224/29691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/2962		Antimony [Sb] as principal constituent	2224/29694		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/296 - H01L 2224/29691
2224/29623		Magnesium [Mg] as principal constituent	2224/29695		with a principal constituent of the material being a gas not provided for in groups H01L 2224/296 - H01L 2224/29691
2224/29624		Aluminium [Al] as principal constituent	2224/29698		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29638		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29699		Material of the matrix
2224/29639		Silver [Ag] as principal constituent	2224/297		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29644		Gold [Au] as principal constituent	2224/29701		the principal constituent melting at a temperature of less than 400°C
2224/29647		Copper [Cu] as principal constituent	2224/29705		Gallium [Ga] as principal constituent
2224/29649		Manganese [Mn] as principal constituent	2224/29709		Indium [In] as principal constituent
2224/29655		Nickel [Ni] as principal constituent	2224/29711		Tin [Sn] as principal constituent
2224/29657		Cobalt [Co] as principal constituent	2224/29713		Bismuth [Bi] as principal constituent
2224/2966		Iron [Fe] as principal constituent	2224/29714		Thallium [Tl] as principal constituent
2224/29663		the principal constituent melting at a temperature of greater than 1550°C	2224/29716		Lead [Pb] as principal constituent
2224/29664		Palladium [Pd] as principal constituent	2224/29717		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29666		Titanium [Ti] as principal constituent			
2224/29669		Platinum [Pt] as principal constituent			
2224/2967		Zirconium [Zr] as principal constituent			
2224/29671		Chromium [Cr] as principal constituent			
2224/29672		Vanadium [V] as principal constituent			
2224/29673		Rhodium [Rh] as principal constituent			
2224/29676		Ruthenium [Ru] as principal constituent			
2224/29678		Iridium [Ir] as principal constituent			
2224/29679		Niobium [Nb] as principal constituent			
2224/2968		Molybdenum [Mo] as principal constituent			
2224/29681		Tantalum [Ta] as principal constituent			

2224/29718		Zinc [Zn] as principal constituent	2224/2979		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/2972		Antimony [Sb] as principal constituent	2224/29791		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29723		Magnesium [Mg] as principal constituent	2224/29793		with a principal constituent of the material being a solid not provided for in groups H01L 2224/297 - H01L 2224/29791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29724		Aluminium [Al] as principal constituent	2224/29794		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/297 - H01L 2224/29791
2224/29738		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29795		with a principal constituent of the material being a gas not provided for in groups H01L 2224/297 - H01L 2224/29791
2224/29739		Silver [Ag] as principal constituent	2224/29798		Fillers
2224/29744		Gold [Au] as principal constituent	2224/29799		Base material
2224/29747		Copper [Cu] as principal constituent	2224/298		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29749		Manganese [Mn] as principal constituent	2224/29801		the principal constituent melting at a temperature of less than 400°C
2224/29755		Nickel [Ni] as principal constituent	2224/29805		Gallium [Ga] as principal constituent
2224/29757		Cobalt [Co] as principal constituent	2224/29809		Indium [In] as principal constituent
2224/2976		Iron [Fe] as principal constituent	2224/29811		Tin [Sn] as principal constituent
2224/29763		the principal constituent melting at a temperature of greater than 1550°C	2224/29813		Bismuth [Bi] as principal constituent
2224/29764		Palladium [Pd] as principal constituent	2224/29814		Thallium [Tl] as principal constituent
2224/29766		Titanium [Ti] as principal constituent	2224/29816		Lead [Pb] as principal constituent
2224/29769		Platinum [Pt] as principal constituent	2224/29817		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/2977		Zirconium [Zr] as principal constituent	2224/29818		Zinc [Zn] as principal constituent
2224/29771		Chromium [Cr] as principal constituent	2224/2982		Antimony [Sb] as principal constituent
2224/29772		Vanadium [V] as principal constituent	2224/29823		Magnesium [Mg] as principal constituent
2224/29773		Rhodium [Rh] as principal constituent	2224/29824		Aluminium [Al] as principal constituent
2224/29776		Ruthenium [Ru] as principal constituent	2224/29838		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29778		Iridium [Ir] as principal constituent	2224/29839		Silver [Ag] as principal constituent
2224/29779		Niobium [Nb] as principal constituent			
2224/2978		Molybdenum [Mo] as principal constituent			
2224/29781		Tantalum [Ta] as principal constituent			
2224/29783		Rhenium [Re] as principal constituent			
2224/29784		Tungsten [W] as principal constituent			
2224/29786		with a principal constituent of the material being a non metallic, non metalloid inorganic material			
2224/29787		Ceramics, e.g. crystalline carbides, nitrides or oxides			
2224/29788		Glasses, e.g. amorphous oxides, nitrides or fluorides			

2224/29844	Gold [Au] as principal constituent	2224/29893	with a principal constituent of the material being a solid not provided for in groups H01L 2224/298 - H01L 2224/29891 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29847	Copper [Cu] as principal constituent	2224/29894	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/298 - H01L 2224/29891
2224/29849	Manganese [Mn] as principal constituent	2224/29895	with a principal constituent of the material being a gas not provided for in groups H01L 2224/298 - H01L 2224/29891
2224/29855	Nickel [Ni] as principal constituent	2224/29898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29857	Cobalt [Co] as principal constituent	2224/29899	Coating material
2224/2986	Iron [Fe] as principal constituent	2224/299	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29863	the principal constituent melting at a temperature of greater than 1550°C	2224/29901	the principal constituent melting at a temperature of less than 400°C
2224/29864	Palladium [Pd] as principal constituent	2224/29905	Gallium [Ga] as principal constituent
2224/29866	Titanium [Ti] as principal constituent	2224/29909	Indium [In] as principal constituent
2224/29869	Platinum [Pt] as principal constituent	2224/29911	Tin [Sn] as principal constituent
2224/2987	Zirconium [Zr] as principal constituent	2224/29913	Bismuth [Bi] as principal constituent
2224/29871	Chromium [Cr] as principal constituent	2224/29914	Thallium [Tl] as principal constituent
2224/29872	Vanadium [V] as principal constituent	2224/29916	Lead [Pb] as principal constituent
2224/29873	Rhodium [Rh] as principal constituent	2224/29917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29876	Ruthenium [Ru] as principal constituent	2224/29918	Zinc [Zn] as principal constituent
2224/29878	Iridium [Ir] as principal constituent	2224/2992	Antimony [Sb] as principal constituent
2224/29879	Niobium [Nb] as principal constituent	2224/29923	Magnesium [Mg] as principal constituent
2224/2988	Molybdenum [Mo] as principal constituent	2224/29924	Aluminium [Al] as principal constituent
2224/29881	Tantalum [Ta] as principal constituent	2224/29938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29883	Rhenium [Re] as principal constituent	2224/29939	Silver [Ag] as principal constituent
2224/29884	Tungsten [W] as principal constituent	2224/29944	Gold [Au] as principal constituent
2224/29886	with a principal constituent of the material being a non metallic, non metalloid inorganic material		
2224/29887	Ceramics, e.g. crystalline carbides, nitrides or oxides		
2224/29888	Glasses, e.g. amorphous oxides, nitrides or fluorides		
2224/2989	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		
2224/29891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		

2224/29947	Copper [Cu] as principal constituent	2224/29994	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/299 - H01L 2224/29991
2224/29949	Manganese [Mn] as principal constituent	2224/29995	with a principal constituent of the material being a gas not provided for in groups H01L 2224/299 - H01L 2224/29991
2224/29955	Nickel [Ni] as principal constituent	2224/29998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29957	Cobalt [Co] as principal constituent	2224/29999	Shape or distribution of the fillers
2224/2996	Iron [Fe] as principal constituent	2224/30	of a plurality of layer connectors
2224/29963	the principal constituent melting at a temperature of greater than 1550°C	2224/3001	Structure
2224/29964	Palladium [Pd] as principal constituent	2224/3003	Layer connectors having different sizes, e.g. different heights or widths
2224/29966	Titanium [Ti] as principal constituent	2224/3005	Shape
2224/29969	Platinum [Pt] as principal constituent	2224/30051	Layer connectors having different shapes
2224/2997	Zirconium [Zr] as principal constituent	2224/301	Disposition
2224/29971	Chromium [Cr] as principal constituent	2224/30104	relative to the bonding areas, e.g. bond pads, of the semiconductor or solid-state body
2224/29972	Vanadium [V] as principal constituent	2224/3011	the layer connectors being bonded to at least one common bonding area
2224/29973	Rhodium [Rh] as principal constituent	2224/3012	Layout
2224/29976	Ruthenium [Ru] as principal constituent	2224/3013	Square or rectangular array
2224/29978	Iridium [Ir] as principal constituent	2224/30131	being uniform, i.e. having a uniform pitch across the array
2224/29979	Niobium [Nb] as principal constituent	2224/30132	being non uniform, i.e. having a non uniform pitch across the array
2224/2998	Molybdenum [Mo] as principal constituent	2224/30133	with a staggered arrangement, e.g. depopulated array
2224/29981	Tantalum [Ta] as principal constituent	2224/30134	covering only portions of the surface to be connected
2224/29983	Rhenium [Re] as principal constituent	2224/30135	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/29984	Tungsten [W] as principal constituent	2224/30136	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/29986	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/3014	Circular array, i.e. array with radial symmetry
2224/29987	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/30141	being uniform, i.e. having a uniform pitch across the array
2224/29988	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/30142	being non uniform, i.e. having a non uniform pitch across the array
2224/2999	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/30143	covering only portions of the surface to be connected
2224/29991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/30145	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/29993	with a principal constituent of the material being a solid not provided for in groups H01L 2224/299 - H01L 2224/29991	2224/30146	Covering only the central area of the surface to be connected, i.e. central arrangements
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/3015	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
		2224/30151	being uniform, i.e. having a uniform pitch across the array

2224/30152	being non uniform, i.e. having a non uniform pitch across the array	2224/32059	comprising protrusions or indentations
2224/30153	with a staggered arrangement, e.g. depopulated array	2224/3207	of bonding interfaces, e.g. interlocking features
2224/30154	covering only portions of the surface to be connected	2224/321	Disposition
2224/30155	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/32104	relative to the bonding area, e.g. bond pad
2224/30156	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/32105	the layer connector connecting bonding areas being not aligned with respect to each other
2224/3016	Random layout, i.e. layout with no symmetry	2224/32106	the layer connector connecting one bonding area to at least two respective bonding areas
2224/30163	with a staggered arrangement	2224/32111	the layer connector being disposed in a recess of the surface
2224/30164	covering only portions of the surface to be connected	2224/32112	the layer connector being at least partially embedded in the surface
2224/30165	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/32113	the whole layer connector protruding from the surface
2224/30166	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/3213	the layer connector connecting within a semiconductor or solid-state body, i.e. connecting two bonding areas on the same semiconductor or solid-state body
2224/30177	Combinations of arrays with different layouts	2224/32135	the layer connector connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/30179	Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body	2224/32137	the bodies being arranged next to each other, e.g. on a common substrate
2224/3018	being disposed on at least two different sides of the body, e.g. dual array	2224/32141	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/30181	On opposite sides of the body	2224/32145	the bodies being stacked
2224/30183	On contiguous sides of the body	2224/32146	the layer connector connecting to a via connection in the semiconductor or solid-state body
2224/305	Material	2224/32147	the layer connector connecting to a bonding area disposed in a recess of the surface
2224/30505	Layer connectors having different materials	2224/32148	the layer connector connecting to a bonding area protruding from the surface
2224/3051	Function	2224/32151	the layer connector connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/30515	Layer connectors having different functions	2224/32153	the body and the item being arranged next to each other, e.g. on a common substrate
2224/30517	including layer connectors providing primarily mechanical bonding	2224/32155	the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/30519	including layer connectors providing primarily thermal dissipation	2224/32157	the layer connector connecting to a bond pad of the item
2224/31	Structure, shape, material or disposition of the layer connectors after the connecting process	2224/3216	the layer connector connecting to a pin of the item
2224/32	of an individual layer connector	2224/32163	the layer connector connecting to a potential ring of the item
2224/3201	Structure	2224/32165	the layer connector connecting to a via metallisation of the item
2224/32012	relative to the bonding area, e.g. bond pad	2224/32167	the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32013	the layer connector being larger than the bonding area, e.g. bond pad		
2224/32014	the layer connector being smaller than the bonding area, e.g. bond pad		
2224/3205	Shape		
2224/32052	in top view		
2224/32053	being non uniform along the layer connector		
2224/32054	being rectangular or square		
2224/32055	being circular or elliptic		
2224/32056	comprising protrusions or indentations		
2224/32057	in side view		
2224/32058	being non uniform along the layer connector		

2224/32168		the layer connector connecting to a bonding area protruding from the surface of the item	2224/32501		at the bonding interface
2224/32175		the item being metallic	2224/32502		comprising an eutectic alloy
2224/32183		the layer connector connecting to a potential ring of the item	2224/32503		comprising an intermetallic compound
2224/32187		the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/32505		outside the bonding interface, e.g. in the bulk of the layer connector
2224/32188		the layer connector connecting to a bonding area protruding from the surface of the item	2224/32506		comprising an eutectic alloy
2224/32195		the item being a discrete passive component	2224/32507		comprising an intermetallic compound
2224/32197		the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33		of a plurality of layer connectors
2224/32198		the layer connector connecting to a bonding area protruding from the surface of the item	2224/3301		Structure
2224/32221		the body and the item being stacked	2224/3303		Layer connectors having different sizes, e.g. different heights or widths
2224/32225		the item being non-metallic, e.g. insulating substrate with or without metallisation	2224/3305		Shape
2224/32227		the layer connector connecting to a bond pad of the item	2224/33051		Layer connectors having different shapes
2224/3223		the layer connector connecting to a pin of the item	2224/33055		of their bonding interfaces
2224/32233		the layer connector connecting to a potential ring of the item	2224/331		Disposition
2224/32235		the layer connector connecting to a via metallisation of the item	2224/33104		relative to the bonding areas, e.g. bond pads
2224/32237		the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33106		the layer connectors being bonded to at least one common bonding area
2224/32238		the layer connector connecting to a bonding area protruding from the surface of the item	2224/33107		the layer connectors connecting two common bonding areas
2224/3224		the layer connector connecting between the body and an opposite side of the item with respect to the body	2224/3312		Layout
2224/32245		the item being metallic	2224/3313		Square or rectangular array
2224/32253		the layer connector connecting to a potential ring of the item	2224/33132		being non uniform, i.e. having a non uniform pitch across the array
2224/32257		the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33133		with a staggered arrangement, e.g. depopulated array
2224/32258		the layer connector connecting to a bonding area protruding from the surface of the item	2224/33134		covering only portions of the surface to be connected
2224/3226		the layer connector connecting between the body and an opposite side of the item with respect to the body	2224/33135		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/32265		the item being a discrete passive component	2224/3314		Circular array, i.e. array with radial symmetry
2224/32267		the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33142		being non uniform, i.e. having a non uniform pitch across the array
2224/32268		the layer connector connecting to a bonding area protruding from the surface of the item	2224/33143		with a staggered arrangement
2224/325		Material	2224/33144		covering only portions of the surface to be connected
			2224/33145		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
			2224/3315		Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
			2224/33151		being uniform, i.e. having a uniform pitch across the array
			2224/33152		being non uniform, i.e. having a non uniform pitch across the array
			2224/33153		with a staggered arrangement, e.g. depopulated array
			2224/33154		covering only portions of the surface to be connected
			2224/33155		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
			2224/33156		Covering only the central area of the surface to be connected, i.e. central arrangements
			2224/3316		Random layout, i.e. layout with no symmetry

2224/33163		with a staggered arrangement	2224/35847		with a mechanical process, e.g. with flattening of the connector
2224/33164		covering only portions of the surface to be connected	2224/35848		Thermal treatments, e.g. annealing, controlled cooling
2224/33165		Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/35985		Methods of manufacturing strap connectors involving a specific sequence of method steps
2224/33177		Combinations of arrays with different layouts	2224/35986		with repetition of the same manufacturing step
2224/33179		Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body	2224/36		Structure, shape, material or disposition of the strap connectors prior to the connecting process
2224/3318		being disposed on at least two different sides of the body, e.g. dual array	2224/37		of an individual strap connector
2224/33181		On opposite sides of the body	2224/37001		Core members of the connector
2224/33183		On contiguous sides of the body	2224/37005		Structure
2224/335		Material	2224/3701		Shape
2224/33505		Layer connectors having different materials	2224/37011		comprising apertures or cavities
2224/3351		Function	2224/37012		Cross-sectional shape
2224/33515		Layer connectors having different functions	2224/37013		being non uniform along the connector
2224/33517		including layer connectors providing primarily mechanical support	2224/3702		Disposition
2224/33519		including layer connectors providing primarily thermal dissipation	2224/37025		Plural core members
2224/34		Strap connectors, e.g. copper straps for grounding power devices; Manufacturing methods related thereto	2224/37026		being mutually engaged together, e.g. through inserts
2224/35		Manufacturing methods	2224/37028		Side-to-side arrangements
2224/35001		Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate	2224/3703		Stacked arrangements
2224/351		Pre-treatment of the preform connector	2224/37032		Two-layer arrangements
2224/3512		Applying permanent coating, e.g. in-situ coating	2224/37033		Three-layer arrangements
2224/35125		Plating, e.g. electroplating, electroless plating	2224/37034		Four-layer arrangements
2224/352		Mechanical processes	2224/37099		Material
2224/3521		Pulling	2224/371		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/355		Modification of a pre-existing material	2224/37101		the principal constituent melting at a temperature of less than 400°C
2224/3551		Sintering	2224/37105		Gallium [Ga] as principal constituent
2224/3552		Anodisation	2224/37109		Indium [In] as principal constituent
2224/357		Involving monitoring, e.g. feedback loop	2224/37111		Tin [Sn] as principal constituent
2224/358		Post-treatment of the connector	2224/37113		Bismuth [Bi] as principal constituent
2224/3581		Cleaning, e.g. oxide removal step, desmearing	2224/37114		Thallium [Tl] as principal constituent
2224/3582		Applying permanent coating, e.g. in-situ coating	2224/37116		Lead [Pb] as principal constituent
2224/35821		Spray coating	2224/37117		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/35822		Dip coating	2224/37118		Zinc [Zn] as principal constituent
2224/35823		Immersion coating, e.g. solder bath	2224/3712		Antimony [Sb] as principal constituent
2224/35824		Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/37123		Magnesium [Mg] as principal constituent
2224/35825		Plating, e.g. electroplating, electroless plating	2224/37124		Aluminium [Al] as principal constituent
2224/35826		Physical vapour deposition [PVD], e.g. evaporation, sputtering	2224/37138		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/35827		Chemical vapour deposition [CVD], e.g. laser CVD	2224/37139		Silver [Ag] as principal constituent
2224/3583		Reworking			
2224/35831		with a chemical process, e.g. with etching of the connector			

2224/37144	Gold [Au] as principal constituent	2224/37194	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/371 - H01L 2224/37191
2224/37147	Copper [Cu] as principal constituent	2224/37195	with a principal constituent of the material being a gas not provided for in groups H01L 2224/371 - H01L 2224/37191
2224/37149	Manganese [Mn] as principal constituent	2224/37198	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37155	Nickel [Ni] as principal constituent	2224/37199	Material of the matrix
2224/37157	Cobalt [Co] as principal constituent	2224/372	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/3716	Iron [Fe] as principal constituent	2224/37201	the principal constituent melting at a temperature of less than 400°C
2224/37163	the principal constituent melting at a temperature of greater than 1550°C	2224/37205	Gallium [Ga] as principal constituent
2224/37164	Palladium [Pd] as principal constituent	2224/37209	Indium [In] as principal constituent
2224/37166	Titanium [Ti] as principal constituent	2224/37211	Tin [Sn] as principal constituent
2224/37169	Platinum [Pt] as principal constituent	2224/37213	Bismuth [Bi] as principal constituent
2224/3717	Zirconium [Zr] as principal constituent	2224/37214	Thallium [Tl] as principal constituent
2224/37171	Chromium [Cr] as principal constituent	2224/37216	Lead [Pb] as principal constituent
2224/37172	Vanadium [V] as principal constituent	2224/37217	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37173	Rhodium [Rh] as principal constituent	2224/37218	Zinc [Zn] as principal constituent
2224/37176	Ruthenium [Ru] as principal constituent	2224/3722	Antimony [Sb] as principal constituent
2224/37178	Iridium [Ir] as principal constituent	2224/37223	Magnesium [Mg] as principal constituent
2224/37179	Niobium [Nb] as principal constituent	2224/37224	Aluminium [Al] as principal constituent
2224/3718	Molybdenum [Mo] as principal constituent	2224/37238	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37181	Tantalum [Ta] as principal constituent	2224/37239	Silver [Ag] as principal constituent
2224/37183	Rhenium [Re] as principal constituent	2224/37244	Gold [Au] as principal constituent
2224/37184	Tungsten [W] as principal constituent	2224/37247	Copper [Cu] as principal constituent
2224/37186	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37249	Manganese [Mn] as principal constituent
2224/37187	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37255	Nickel [Ni] as principal constituent
2224/37188	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37257	Cobalt [Co] as principal constituent
2224/3719	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		
2224/37191	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		
2224/37193	with a principal constituent of the material being a solid not provided for in groups H01L 2224/371 - H01L 2224/37191 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond		

2224/3726	Iron [Fe] as principal constituent	2224/373	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37263	the principal constituent melting at a temperature of greater than 1550°C	2224/37301	the principal constituent melting at a temperature of less than 400°C
2224/37264	Palladium [Pd] as principal constituent	2224/37305	Gallium [Ga] as principal constituent
2224/37266	Titanium [Ti] as principal constituent	2224/37309	Indium [In] as principal constituent
2224/37269	Platinum [Pt] as principal constituent	2224/37311	Tin [Sn] as principal constituent
2224/3727	Zirconium [Zr] as principal constituent	2224/37313	Bismuth [Bi] as principal constituent
2224/37271	Chromium [Cr] as principal constituent	2224/37314	Thallium [Tl] as principal constituent
2224/37272	Vanadium [V] as principal constituent	2224/37316	Lead [Pb] as principal constituent
2224/37273	Rhodium [Rh] as principal constituent	2224/37317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37276	Ruthenium [Ru] as principal constituent	2224/37318	Zinc [Zn] as principal constituent
2224/37278	Iridium [Ir] as principal constituent	2224/3732	Antimony [Sb] as principal constituent
2224/37279	Niobium [Nb] as principal constituent	2224/37323	Magnesium [Mg] as principal constituent
2224/3728	Molybdenum [Mo] as principal constituent	2224/37324	Aluminium [Al] as principal constituent
2224/37281	Tantalum [Ta] as principal constituent	2224/37338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37283	Rhenium [Re] as principal constituent	2224/37339	Silver [Ag] as principal constituent
2224/37284	Tungsten [W] as principal constituent	2224/37344	Gold [Au] as principal constituent
2224/37286	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37347	Copper [Cu] as principal constituent
2224/37287	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37349	Manganese [Mn] as principal constituent
2224/37288	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37355	Nickel [Ni] as principal constituent
2224/3729	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37357	Cobalt [Co] as principal constituent
2224/37291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/3736	Iron [Fe] as principal constituent
2224/37293	with a principal constituent of the material being a solid not provided for in groups H01L 2224/372 - H01L 2224/37291 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37363	the principal constituent melting at a temperature of greater than 1550°C
2224/37294	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/372 - H01L 2224/37291	2224/37364	Palladium [Pd] as principal constituent
2224/37295	with a principal constituent of the material being a gas not provided for in groups H01L 2224/372 - H01L 2224/37291	2224/37366	Titanium [Ti] as principal constituent
2224/37298	Fillers	2224/37369	Platinum [Pt] as principal constituent
2224/37299	Base material	2224/3737	Zirconium [Zr] as principal constituent

2224/37371	Chromium [Cr] as principal constituent	2224/37401	the principal constituent melting at a temperature of less than 400°C
2224/37372	Vanadium [V] as principal constituent	2224/37405	Gallium [Ga] as principal constituent
2224/37373	Rhodium [Rh] as principal constituent	2224/37409	Indium [In] as principal constituent
2224/37376	Ruthenium [Ru] as principal constituent	2224/37411	Tin [Sn] as principal constituent
2224/37378	Iridium [Ir] as principal constituent	2224/37413	Bismuth [Bi] as principal constituent
2224/37379	Niobium [Nb] as principal constituent	2224/37414	Thallium [Tl] as principal constituent
2224/3738	Molybdenum [Mo] as principal constituent	2224/37416	Lead [Pb] as principal constituent
2224/37381	Tantalum [Ta] as principal constituent	2224/37417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37383	Rhenium [Re] as principal constituent	2224/37418	Zinc [Zn] as principal constituent
2224/37384	Tungsten [W] as principal constituent	2224/3742	Antimony [Sb] as principal constituent
2224/37386	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37423	Magnesium [Mg] as principal constituent
2224/37387	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37424	Aluminium [Al] as principal constituent
2224/37388	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/3739	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37439	Silver [Ag] as principal constituent
2224/37391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37444	Gold [Au] as principal constituent
2224/37393	with a principal constituent of the material being a solid not provided for in groups H01L 2224/373 - H01L 2224/37391 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37447	Copper [Cu] as principal constituent
2224/37394	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/373 - H01L 2224/37391	2224/37449	Manganese [Mn] as principal constituent
2224/37395	with a principal constituent of the material being a gas not provided for in groups H01L 2224/373 - H01L 2224/37391	2224/37455	Nickel [Ni] as principal constituent
2224/37398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/37457	Cobalt [Co] as principal constituent
2224/37399	Coating material	2224/3746	Iron [Fe] as principal constituent
2224/374	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37463	the principal constituent melting at a temperature of greater than 1550°C
		2224/37464	Palladium [Pd] as principal constituent
		2224/37466	Titanium [Ti] as principal constituent
		2224/37469	Platinum [Pt] as principal constituent
		2224/3747	Zirconium [Zr] as principal constituent
		2224/37471	Chromium [Cr] as principal constituent
		2224/37472	Vanadium [V] as principal constituent
		2224/37473	Rhodium [Rh] as principal constituent
		2224/37476	Ruthenium [Ru] as principal constituent

2224/37478	Iridium [Ir] as principal constituent	2224/37599	Material
2224/37479	Niobium [Nb] as principal constituent	2224/376	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/3748	Molybdenum [Mo] as principal constituent	2224/37601	the principal constituent melting at a temperature of less than 400°C
2224/37481	Tantalum [Ta] as principal constituent	2224/37605	Gallium [Ga] as principal constituent
2224/37483	Rhenium [Re] as principal constituent	2224/37609	Indium [In] as principal constituent
2224/37484	Tungsten [W] as principal constituent	2224/37611	Tin [Sn] as principal constituent
2224/37486	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37613	Bismuth [Bi] as principal constituent
2224/37487	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37614	Thallium [Tl] as principal constituent
2224/37488	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37616	Lead [Pb] as principal constituent
2224/3749	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37618	Zinc [Zn] as principal constituent
2224/37493	with a principal constituent of the material being a solid not provided for in groups H01L 2224/374 - H01L 2224/37491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/3762	Antimony [Sb] as principal constituent
2224/37494	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/374 - H01L 2224/37491	2224/37623	Magnesium [Mg] as principal constituent
2224/37495	with a principal constituent of the material being a gas not provided for in groups H01L 2224/374 - H01L 2224/37491	2224/37624	Aluminium [Al] as principal constituent
2224/37498	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/37638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37499	Shape or distribution of the fillers	2224/37639	Silver [Ag] as principal constituent
2224/3754	Coating	2224/37644	Gold [Au] as principal constituent
2224/37541	Structure	2224/37647	Copper [Cu] as principal constituent
2224/3755	Shape	2224/37649	Manganese [Mn] as principal constituent
2224/3756	Disposition, e.g. coating on a part of the core	2224/37655	Nickel [Ni] as principal constituent
2224/37565	Single coating layer	2224/37657	Cobalt [Co] as principal constituent
2224/3757	Plural coating layers	2224/3766	Iron [Fe] as principal constituent
2224/37572	Two-layer stack coating	2224/37663	the principal constituent melting at a temperature of greater than 1550°C
2224/37573	Three-layer stack coating	2224/37664	Palladium [Pd] as principal constituent
2224/37574	Four-layer stack coating	2224/37666	Titanium [Ti] as principal constituent
2224/37576	being mutually engaged together, e.g. through inserts	2224/37669	Platinum [Pt] as principal constituent
2224/37578	being disposed next to each other, e.g. side-to-side arrangements	2224/3767	Zirconium [Zr] as principal constituent
		2224/37671	Chromium [Cr] as principal constituent
		2224/37672	Vanadium [V] as principal constituent
		2224/37673	Rhodium [Rh] as principal constituent

2224/37676	Ruthenium [Ru] as principal constituent	2224/37713	Bismuth [Bi] as principal constituent
2224/37678	Iridium [Ir] as principal constituent	2224/37714	Thallium [Tl] as principal constituent
2224/37679	Niobium [Nb] as principal constituent	2224/37716	Lead [Pb] as principal constituent
2224/3768	Molybdenum [Mo] as principal constituent	2224/37717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37681	Tantalum [Ta] as principal constituent	2224/37718	Zinc [Zn] as principal constituent
2224/37683	Rhenium [Re] as principal constituent	2224/3772	Antimony [Sb] as principal constituent
2224/37684	Tungsten [W] as principal constituent	2224/37723	Magnesium [Mg] as principal constituent
2224/37686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37724	Aluminium [Al] as principal constituent
2224/37687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37739	Silver [Ag] as principal constituent
2224/3769	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37744	Gold [Au] as principal constituent
2224/37691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37747	Copper [Cu] as principal constituent
2224/37693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/376 - H01L 2224/37691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37749	Manganese [Mn] as principal constituent
2224/37694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/376 - H01L 2224/37691	2224/37755	Nickel [Ni] as principal constituent
2224/37695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/376 - H01L 2224/37691	2224/37757	Cobalt [Co] as principal constituent
2224/37698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/3776	Iron [Fe] as principal constituent
2224/37699	Material of the matrix	2224/37763	the principal constituent melting at a temperature of greater than 1550°C
2224/377	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37764	Palladium [Pd] as principal constituent
2224/37701	the principal constituent melting at a temperature of less than 400°C	2224/37766	Titanium [Ti] as principal constituent
2224/37705	Gallium [Ga] as principal constituent	2224/37769	Platinum [Pt] as principal constituent
2224/37709	Indium [In] as principal constituent	2224/3777	Zirconium [Zr] as principal constituent
2224/37711	Tin [Sn] as principal constituent	2224/37771	Chromium [Cr] as principal constituent
		2224/37772	Vanadium [V] as principal constituent
		2224/37773	Rhodium [Rh] as principal constituent
		2224/37776	Ruthenium [Ru] as principal constituent
		2224/37778	Iridium [Ir] as principal constituent
		2224/37779	Niobium [Nb] as principal constituent
		2224/3778	Molybdenum [Mo] as principal constituent
		2224/37781	Tantalum [Ta] as principal constituent

2224/37783	Rhenium [Re] as principal constituent	2224/37823	Magnesium [Mg] as principal constituent
2224/37784	Tungsten [W] as principal constituent	2224/37824	Aluminium [Al] as principal constituent
2224/37786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37839	Silver [Ag] as principal constituent
2224/37788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37844	Gold [Au] as principal constituent
2224/3779	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37847	Copper [Cu] as principal constituent
2224/37791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37849	Manganese [Mn] as principal constituent
2224/37793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/377 - H01L 2224/37791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37855	Nickel [Ni] as principal constituent
2224/37794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/377 - H01L 2224/37791	2224/37857	Cobalt [Co] as principal constituent
2224/37795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/377 - H01L 2224/37791	2224/3786	Iron [Fe] as principal constituent
2224/37798	Fillers	2224/37863	the principal constituent melting at a temperature of greater than 1550°C
2224/37799	Base material	2224/37864	Palladium [Pd] as principal constituent
2224/378	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37866	Titanium [Ti] as principal constituent
2224/37801	the principal constituent melting at a temperature of less than 400°C	2224/37869	Platinum [Pt] as principal constituent
2224/37805	Gallium [Ga] as principal constituent	2224/3787	Zirconium [Zr] as principal constituent
2224/37809	Indium [In] as principal constituent	2224/37871	Chromium [Cr] as principal constituent
2224/37811	Tin [Sn] as principal constituent	2224/37872	Vanadium [V] as principal constituent
2224/37813	Bismuth [Bi] as principal constituent	2224/37873	Rhodium [Rh] as principal constituent
2224/37814	Thallium [Tl] as principal constituent	2224/37876	Ruthenium [Ru] as principal constituent
2224/37816	Lead [Pb] as principal constituent	2224/37878	Iridium [Ir] as principal constituent
2224/37817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/37879	Niobium [Nb] as principal constituent
2224/37818	Zinc [Zn] as principal constituent	2224/3788	Molybdenum [Mo] as principal constituent
2224/3782	Antimony [Sb] as principal constituent	2224/37881	Tantalum [Ta] as principal constituent
		2224/37883	Rhenium [Re] as principal constituent
		2224/37884	Tungsten [W] as principal constituent
		2224/37886	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/37887	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/37888	Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/3789	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37939	Silver [Ag] as principal constituent
2224/37893	with a principal constituent of the material being a solid not provided for in groups H01L 2224/378 - H01L 2224/37891	2224/37944	Gold [Au] as principal constituent
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37947	Copper [Cu] as principal constituent
2224/37894	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/378 - H01L 2224/37891	2224/37949	Manganese [Mn] as principal constituent
2224/37895	with a principal constituent of the material being a gas not provided for in groups H01L 2224/378 - H01L 2224/37891	2224/37955	Nickel [Ni] as principal constituent
2224/37898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/37957	Cobalt [Co] as principal constituent
2224/37899	Coating material	2224/3796	Iron [Fe] as principal constituent
2224/379	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37963	the principal constituent melting at a temperature of greater than 1550°C
2224/37901	the principal constituent melting at a temperature of less than 400°C	2224/37964	Palladium [Pd] as principal constituent
2224/37905	Gallium [Ga] as principal constituent	2224/37966	Titanium [Ti] as principal constituent
2224/37909	Indium [In] as principal constituent	2224/37969	Platinum [Pt] as principal constituent
2224/37911	Tin [Sn] as principal constituent	2224/3797	Zirconium [Zr] as principal constituent
2224/37913	Bismuth [Bi] as principal constituent	2224/37971	Chromium [Cr] as principal constituent
2224/37914	Thallium [Tl] as principal constituent	2224/37972	Vanadium [V] as principal constituent
2224/37916	Lead [Pb] as principal constituent	2224/37973	Rhodium [Rh] as principal constituent
2224/37917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/37976	Ruthenium [Ru] as principal constituent
2224/37918	Zinc [Zn] as principal constituent	2224/37978	Iridium [Ir] as principal constituent
2224/3792	Antimony [Sb] as principal constituent	2224/37979	Niobium [Nb] as principal constituent
2224/37923	Magnesium [Mg] as principal constituent	2224/3798	Molybdenum [Mo] as principal constituent
2224/37924	Aluminium [Al] as principal constituent	2224/37981	Tantalum [Ta] as principal constituent
		2224/37983	Rhenium [Re] as principal constituent
		2224/37984	Tungsten [W] as principal constituent
		2224/37986	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/37987	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/37988	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/3799	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/37991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/37993	with a principal constituent of the material being a solid not provided for in groups H01L 2224/379 - H01L 2224/37991	2224/40145	the bodies being stacked
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/40147	with an intermediate bond, e.g. continuous strap daisy chain
2224/37994	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/379 - H01L 2224/37991	2224/40151	Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/37995	with a principal constituent of the material being a gas not provided for in groups H01L 2224/379 - H01L 2224/37991	2224/40153	the body and the item being arranged next to each other, e.g. on a common substrate
2224/37998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/40155	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/37999	Shape or distribution of the fillers	2224/40157	Connecting the strap to a bond pad of the item
2224/38	of a plurality of strap connectors	2224/40158	the bond pad being disposed in a recess of the surface of the item
2224/39	Structure, shape, material or disposition of the strap connectors after the connecting process	2224/40159	the bond pad protruding from the surface of the item
2224/40	of an individual strap connector	2224/4016	Connecting the strap to a pin of the item
2224/4001	Structure	2224/40163	Connecting the strap to a potential ring of the item
2224/4005	Shape	2224/40165	Connecting the strap to a via metallisation of the item
2224/4007	of bonding interfaces, e.g. interlocking features	2224/40175	the item being metallic
2224/4009	Loop shape	2224/40177	Connecting the strap to a bond pad of the item
2224/40091	Arched	2224/40178	the bond pad being disposed in a recess of the surface of the item
2224/40095	Kinked	2224/40179	the bond pad protruding from the surface of the item
2224/401	Disposition	2224/40183	Connecting the strap to a potential ring of the item
2224/40101	Connecting bonding areas at the same height, e.g. horizontal bond	2224/40195	the item being a discrete passive component
2224/40105	Connecting bonding areas at different heights	2224/40221	the body and the item being stacked
2224/40106	the connector being orthogonal to a side surface of the semiconductor or solid-state body, e.g. parallel layout	2224/40225	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/40108	the connector not being orthogonal to a side surface of the semiconductor or solid-state body, e.g. fanned-out connectors, radial layout	2224/40227	Connecting the strap to a bond pad of the item
2224/40111	the strap connector extending above another semiconductor or solid-state body	2224/40228	the bond pad being disposed in a recess of the surface of the item
2224/4013	Connecting within a semiconductor or solid-state body, i.e. fly strap, bridge strap	2224/40229	the bond pad protruding from the surface of the item
2224/40132	with an intermediate bond, e.g. continuous strap daisy chain	2224/4023	Connecting the strap to a pin of the item
2224/40135	Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/40233	Connecting the strap to a potential ring of the item
2224/40137	the bodies being arranged next to each other, e.g. on a common substrate	2224/40235	Connecting the strap to a via metallisation of the item
2224/40139	with an intermediate bond, e.g. continuous strap daisy chain	2224/40237	Connecting the strap to a die pad of the item
2224/40141	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements	2224/4024	Connecting between the body and an opposite side of the item with respect to the body
		2224/40245	the item being metallic
		2224/40247	Connecting the strap to a bond pad of the item

2224/40248		the bond pad being disposed in a recess of the surface of the item	2224/41052		Different loop heights
2224/40249		the bond pad protruding from the surface of the item	2224/411		Disposition
2224/40253		Connecting the strap to a potential ring of the item	2224/41105		Connecting at different heights
2224/40257		Connecting the strap to a die pad of the item	2224/41107		on the semiconductor or solid-state body being
2224/4026		Connecting between the body and an opposite side of the item with respect to the body	2224/41109		outside the semiconductor or solid-state body
2224/40265		the item being a discrete passive component	2224/4111		the connectors being bonded to at least one common bonding area, e.g. daisy chain
2224/404		Connecting portions	2224/41111		the connectors connecting two common bonding areas
2224/4046		with multiple bonds on the same bonding area	2224/41112		the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body, e.g. diverging straps
2224/40475		connected to auxiliary connecting means on the bonding areas	2224/41113		the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body, e.g. converging straps
2224/40477		being a pre-ball (i.e. a ball formed by capillary bonding)	2224/4112		Layout
2224/40479		on the semiconductor or solid-state body	2224/4117		Crossed straps
2224/4048		outside the semiconductor or solid-state body	2224/41171		Fan-out arrangements
2224/40484		being a plurality of pre-balls disposed side-to-side	2224/41173		Radial fan-out arrangements
2224/40486		on the semiconductor or solid-state body	2224/41174		Stacked arrangements
2224/40487		outside the semiconductor or solid-state body	2224/41175		Parallel arrangements
2224/40491		being an additional member attached to the bonding area through an adhesive or solder, e.g. buffer pad	2224/41176		Strap connectors having the same loop shape and height
2224/40496		not being interposed between the connector and the bonding area	2224/41177		Combinations of different arrangements
2224/40499		Material of the auxiliary connecting means	2224/41179		Corner adaptations, i.e. disposition of the strap connectors at the corners of the semiconductor or solid-state body
2224/405		Material	2224/4118		being disposed on at least two different sides of the body, e.g. dual array
2224/40505		at the bonding interface	2224/414		Connecting portions
2224/40506		comprising an eutectic alloy	2224/4141		the connecting portions being stacked
2224/40507		comprising an intermetallic compound	2224/41421		on the semiconductor or solid-state body
2224/4051		Morphology of the connecting portion, e.g. grain size distribution	2224/41422		outside the semiconductor or solid-state body
2224/4052		Bonding interface between the connecting portion and the bonding area	2224/4143		the connecting portions being staggered
2224/4099		Auxiliary members for strap connectors, e.g. flow-barriers, spacers	2224/415		Material
2224/40991		being formed on the semiconductor or solid-state body to be connected	2224/41505		Connectors having different materials
2224/40992		Reinforcing structures	2224/42		Wire connectors; Manufacturing methods related thereto
2224/40993		Alignment aids	2224/43		Manufacturing methods
2224/40996		being formed on an item to be connected not being a semiconductor or solid-state body	2224/43001		Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/40997		Reinforcing structures	2224/431		Pre-treatment of the preform connector
2224/40998		Alignment aids	2224/4312		Applying permanent coating, e.g. in-situ coating
2224/41		of a plurality of strap connectors	2224/43125		Plating, e.g. electroplating, electroless plating
2224/4101		Structure	2224/432		Mechanical processes
2224/4103		Connectors having different sizes	2224/4321		Pulling
2224/4105		Shape	2224/435		Modification of a pre-existing material
2224/41051		Connectors having different shapes	2224/4351		Sintering
			2224/4352		Anodisation

2224/437		Involving monitoring, e.g. feedback loop	2224/45109		Indium (In) as principal constituent
2224/438		Post-treatment of the connector	2224/45111		Tin (Sn) as principal constituent
2224/4381		Cleaning, e.g. oxide removal step, desmearing	2224/45113		Bismuth (Bi) as principal constituent
2224/4382		Applying permanent coating, e.g. in-situ coating	2224/45114		Thallium (Tl) as principal constituent
2224/43821		Spray coating	2224/45116		Lead (Pb) as principal constituent
2224/43822		Dip coating	2224/45117		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/43823		Immersion coating, e.g. solder bath	2224/45118		Zinc (Zn) as principal constituent
2224/43824		Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/4512		Antimony (Sb) as principal constituent
2224/43825		Plating, e.g. electroplating, electroless plating	2224/45123		Magnesium (Mg) as principal constituent
2224/43826		Physical vapour deposition [PVD], e.g. evaporation, sputtering	2224/45124		Aluminium (Al) as principal constituent
2224/43827		Chemical vapour deposition [CVD], e.g. laser CVD	2224/45138		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/4383		Reworking	2224/45139		Silver (Ag) as principal constituent
2224/43831		with a chemical process, e.g. with etching of the connector	2224/45144		Gold (Au) as principal constituent
2224/43847		with a mechanical process, e.g. with flattening of the connector	2224/45147		Copper (Cu) as principal constituent
2224/43848		Thermal treatments, e.g. annealing, controlled cooling	2224/45149		Manganese (Mn) as principal constituent
2224/43985		Methods of manufacturing wire connectors involving a specific sequence of method steps	2224/45155		Nickel (Ni) as principal constituent
2224/43986		with repetition of the same manufacturing step	2224/45157		Cobalt (Co) as principal constituent
2224/44	. . .	Structure, shape, material or disposition of the wire connectors prior to the connecting process	2224/4516		Iron (Fe) as principal constituent
2224/45		of an individual wire connector	2224/45163		the principal constituent melting at a temperature of greater than 1550°C
2224/45001		Core members of the connector	2224/45164		Palladium (Pd) as principal constituent
2224/45005		Structure	2224/45166		Titanium (Ti) as principal constituent
2224/4501		Shape	2224/45169		Platinum (Pt) as principal constituent
2224/45012		Cross-sectional shape	2224/4517		Zirconium (Zr) as principal constituent
2224/45013		being non uniform along the connector	2224/45171		Chromium (Cr) as principal constituent
2224/45014		Ribbon connectors, e.g. rectangular cross-section	2224/45172		Vanadium (V) as principal constituent
2224/45015		being circular	2224/45173		Rhodium (Rh) as principal constituent
2224/45016		being elliptic	2224/45176		Ruthenium (Ru) as principal constituent
2224/4502		Disposition	2224/45178		Iridium (Ir) as principal constituent
2224/45025		Plural core members	2224/45179		Niobium (Nb) as principal constituent
2224/45026		being mutually engaged together, e.g. through inserts	2224/4518		Molybdenum (Mo) as principal constituent
2224/45028		Side-to-side arrangements	2224/45181		Tantalum (Ta) as principal constituent
2224/4503		Stacked arrangements	2224/45183		Rhenium (Re) as principal constituent
2224/45032		Two-layer arrangements			
2224/45033		Three-layer arrangements			
2224/45034		Four-layer arrangements			
2224/45099		Material			
2224/451		with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof			
2224/45101		the principal constituent melting at a temperature of less than 400°C			
2224/45105		Gallium (Ga) as principal constituent			

2224/45184	 Tungsten (W) as principal constituent	2224/4522	 Antimony (Sb) as principal constituent
2224/45186	 with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/45223	 Magnesium (Mg) as principal constituent
2224/45187	 Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/45224	 Aluminium (Al) as principal constituent
2224/45188	 Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/45238	 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/4519	 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/45239	 Silver (Ag) as principal constituent
2224/45191	 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/45244	 Gold (Au) as principal constituent
2224/45193	 with a principal constituent of the material being a solid not provided for in groups H01L 2224/451 - H01L 2224/45191 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/45247	 Copper (Cu) as principal constituent
2224/45194	 with a principal constituent of the material being a liquid not provided for in groups H01L 2224/451 - H01L 2224/45191	2224/45249	 Manganese (Mn) as principal constituent
2224/45195	 with a principal constituent of the material being a gas not provided for in groups H01L 2224/451 - H01L 2224/45191	2224/45255	 Nickel (Ni) as principal constituent
2224/45198	 with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45257	 Cobalt (Co) as principal constituent
2224/45199	 Material of the matrix	2224/4526	 Iron (Fe) as principal constituent
2224/452	 with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45263	 the principal constituent melting at a temperature of greater than 1550°C
2224/45201	 the principal constituent melting at a temperature of less than 400°C	2224/45264	 Palladium (Pd) as principal constituent
2224/45205	 Gallium (Ga) as principal constituent	2224/45266	 Titanium (Ti) as principal constituent
2224/45209	 Indium (In) as principal constituent	2224/45269	 Platinum (Pt) as principal constituent
2224/45211	 Tin (Sn) as principal constituent	2224/4527	 Zirconium (Zr) as principal constituent
2224/45213	 Bismuth (Bi) as principal constituent	2224/45271	 Chromium (Cr) as principal constituent
2224/45214	 Thallium (Tl) as principal constituent	2224/45272	 Vanadium (V) as principal constituent
2224/45216	 Lead (Pb) as principal constituent	2224/45273	 Rhodium (Rh) as principal constituent
2224/45217	 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45276	 Ruthenium (Ru) as principal constituent
2224/45218	 Zinc (Zn) as principal constituent	2224/45278	 Iridium (Ir) as principal constituent
		2224/45279	 Niobium (Nb) as principal constituent
		2224/4528	 Molybdenum (Mo) as principal constituent
		2224/45281	 Tantalum (Ta) as principal constituent
		2224/45283	 Rhenium (Re) as principal constituent
		2224/45284	 Tungsten (W) as principal constituent
		2224/45286	 with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/45287	 Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/45288	 Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/4529	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/45344	Gold (Au) as principal constituent
2224/45291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/45347	Copper (Cu) as principal constituent
2224/45293	with a principal constituent of the material being a solid not provided for in groups H01L 2224/452 - H01L 2224/45291 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/45349	Manganese (Mn) as principal constituent
2224/45294	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/452 - H01L 2224/45291	2224/45355	Nickel (Ni) as principal constituent
2224/45295	with a principal constituent of the material being a gas not provided for in groups H01L 2224/452 - H01L 2224/45291	2224/45357	Cobalt (Co) as principal constituent
2224/45298	Fillers	2224/4536	Iron (Fe) as principal constituent
2224/45299	Base material	2224/45363	the principal constituent melting at a temperature of greater than 1550°C
2224/453	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45364	Palladium (Pd) as principal constituent
2224/45301	the principal constituent melting at a temperature of less than 400°C	2224/45366	Titanium (Ti) as principal constituent
2224/45305	Gallium (Ga) as principal constituent	2224/45369	Platinum (Pt) as principal constituent
2224/45309	Indium (In) as principal constituent	2224/4537	Zirconium (Zr) as principal constituent
2224/45311	Tin (Sn) as principal constituent	2224/45371	Chromium (Cr) as principal constituent
2224/45313	Bismuth (Bi) as principal constituent	2224/45372	Vanadium (V) as principal constituent
2224/45314	Thallium (Tl) as principal constituent	2224/45373	Rhodium (Rh) as principal constituent
2224/45316	Lead (Pb) as principal constituent	2224/45376	Ruthenium (Ru) as principal constituent
2224/45317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45378	Iridium (Ir) as principal constituent
2224/45318	Zinc (Zn) as principal constituent	2224/45379	Niobium (Nb) as principal constituent
2224/4532	Antimony (Sb) as principal constituent	2224/4538	Molybdenum (Mo) as principal constituent
2224/45323	Magnesium (Mg) as principal constituent	2224/45381	Tantalum (Ta) as principal constituent
2224/45324	Aluminium (Al) as principal constituent	2224/45383	Rhenium (Re) as principal constituent
2224/45338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45384	Tungsten (W) as principal constituent
2224/45339	Silver (Ag) as principal constituent	2224/45386	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/45387	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/45388	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/4539	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/45391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/45393	with a principal constituent of the material being a solid not provided for in groups H01L 2224/453 - H01L 2224/45391 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/45447	Copper (Cu) as principal constituent
2224/45394	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/453 - H01L 2224/45391	2224/45449	Manganese (Mn) as principal constituent
2224/45395	with a principal constituent of the material being a gas not provided for in groups H01L 2224/453 - H01L 2224/45391	2224/45455	Nickel (Ni) as principal constituent
2224/45398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45457	Cobalt (Co) as principal constituent
2224/45399	Coating material	2224/4546	Iron (Fe) as principal constituent
2224/454	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45463	the principal constituent melting at a temperature of greater than 1550°C
2224/45401	the principal constituent melting at a temperature of less than 400°C	2224/45464	Palladium (Pd) as principal constituent
2224/45405	Gallium (Ga) as principal constituent	2224/45466	Titanium (Ti) as principal constituent
2224/45409	Indium (In) as principal constituent	2224/45469	Platinum (Pt) as principal constituent
2224/45411	Tin (Sn) as principal constituent	2224/4547	Zirconium (Zr) as principal constituent
2224/45413	Bismuth (Bi) as principal constituent	2224/45471	Chromium (Cr) as principal constituent
2224/45414	Thallium (Tl) as principal constituent	2224/45472	Vanadium (V) as principal constituent
2224/45416	Lead (Pb) as principal constituent	2224/45473	Rhodium (Rh) as principal constituent
2224/45417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45476	Ruthenium (Ru) as principal constituent
2224/45418	Zinc (Zn) as principal constituent	2224/45478	Iridium (Ir) as principal constituent
2224/4542	Antimony (Sb) as principal constituent	2224/45479	Niobium (Nb) as principal constituent
2224/45423	Magnesium (Mg) as principal constituent	2224/4548	Molybdenum (Mo) as principal constituent
2224/45424	Aluminium (Al) as principal constituent	2224/45481	Tantalum (Ta) as principal constituent
2224/45438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45483	Rhenium (Re) as principal constituent
2224/45439	Silver (Ag) as principal constituent	2224/45484	Tungsten (W) as principal constituent
2224/45444	Gold (Au) as principal constituent	2224/45486	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/45487	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/45488	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/4549	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/45491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
		2224/45493	with a principal constituent of the material being a solid not provided for in groups H01L 2224/454 - H01L 2224/45491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/45494		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/454 - H01L 2224/45491	2224/45639		Silver (Ag) as principal constituent
2224/45495		with a principal constituent of the material being a gas not provided for in groups H01L 2224/454 - H01L 2224/45491	2224/45644		Gold (Au) as principal constituent
2224/45498		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45647		Copper (Cu) as principal constituent
2224/45499		Shape or distribution of the fillers	2224/45649		Manganese (Mn) as principal constituent
2224/4554		Coating	2224/45655		Nickel (Ni) as principal constituent
2224/45541		Structure	2224/45657		Cobalt (Co) as principal constituent
2224/4555		Shape	2224/4566		Iron (Fe) as principal constituent
2224/4556		Disposition, e.g. coating on a part of the core	2224/45663		the principal constituent melting at a temperature of greater than 1550°C
2224/45565		Single coating layer	2224/45664		Palladium (Pd) as principal constituent
2224/4557		Plural coating layers	2224/45666		Titanium (Ti) as principal constituent
2224/45572		Two-layer stack coating	2224/45669		Platinum (Pt) as principal constituent
2224/45573		Three-layer stack coating	2224/4567		Zirconium (Zr) as principal constituent
2224/45574		Four-layer stack coating	2224/45671		Chromium (Cr) as principal constituent
2224/45576		being mutually engaged together, e.g. through inserts	2224/45672		Vanadium (V) as principal constituent
2224/45578		being disposed next to each other, e.g. side-to-side arrangements	2224/45673		Rhodium (Rh) as principal constituent
2224/45599		Material	2224/45676		Ruthenium (Ru) as principal constituent
2224/456		with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45678		Iridium (Ir) as principal constituent
2224/45601		the principal constituent melting at a temperature of less than 400°C	2224/45679		Niobium (Nb) as principal constituent
2224/45605		Gallium (Ga) as principal constituent	2224/4568		Molybdenum (Mo) as principal constituent
2224/45609		Indium (In) as principal constituent	2224/45681		Tantalum (Ta) as principal constituent
2224/45611		Tin (Sn) as principal constituent	2224/45683		Rhenium (Re) as principal constituent
2224/45613		Bismuth (Bi) as principal constituent	2224/45684		Tungsten (W) as principal constituent
2224/45614		Thallium (Tl) as principal constituent	2224/45686		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45616		Lead (Pb) as principal constituent	2224/45687		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45617		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45688		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/45618		Zinc (Zn) as principal constituent	2224/4569		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/4562		Antimony (Sb) as principal constituent	2224/45691		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45623		Magnesium (Mg) as principal constituent	2224/45693		with a principal constituent of the material being a solid not provided for in groups H01L 2224/456 - H01L 2224/45691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45624		Aluminium (Al) as principal constituent			
2224/45638		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C			

2224/45694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/456 - H01L 2224/45691	2224/4576	Iron (Fe) as principal constituent
2224/45695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/456 - H01L 2224/45691	2224/45763	the principal constituent melting at a temperature of greater than 1550°C
2224/45698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45764	Palladium (Pd) as principal constituent
2224/45699	Material of the matrix	2224/45766	Titanium (Ti) as principal constituent
2224/457	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45769	Platinum (Pt) as principal constituent
2224/45701	the principal constituent melting at a temperature of less than 400°C	2224/4577	Zirconium (Zr) as principal constituent
2224/45705	Gallium (Ga) as principal constituent	2224/45771	Chromium (Cr) as principal constituent
2224/45709	Indium (In) as principal constituent	2224/45772	Vanadium (V) as principal constituent
2224/45711	Tin (Sn) as principal constituent	2224/45773	Rhodium (Rh) as principal constituent
2224/45713	Bismuth (Bi) as principal constituent	2224/45776	Ruthenium (Ru) as principal constituent
2224/45714	Thallium (Tl) as principal constituent	2224/45778	Iridium (Ir) as principal constituent
2224/45716	Lead (Pb) as principal constituent	2224/45779	Niobium (Nb) as principal constituent
2224/45717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/4578	Molybdenum (Mo) as principal constituent
2224/45718	Zinc (Zn) as principal constituent	2224/45781	Tantalum (Ta) as principal constituent
2224/4572	Antimony (Sb) as principal constituent	2224/45783	Rhenium (Re) as principal constituent
2224/45723	Magnesium (Mg) as principal constituent	2224/45784	Tungsten (W) as principal constituent
2224/45724	Aluminium (Al) as principal constituent	2224/45786	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45739	Silver (Ag) as principal constituent	2224/45788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/45744	Gold (Au) as principal constituent	2224/4579	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45747	Copper (Cu) as principal constituent	2224/45791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45749	Manganese (Mn) as principal constituent	2224/45793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/457 - H01L 2224/45791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45755	Nickel (Ni) as principal constituent	2224/45794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/457 - H01L 2224/45791
2224/45757	Cobalt (Co) as principal constituent	2224/45795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/457 - H01L 2224/45791
		2224/45798	Fillers
		2224/45799	Base material

2224/458	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45871	Chromium (Cr) as principal constituent
2224/45801	the principal constituent melting at a temperature of less than 400°C	2224/45872	Vanadium (V) as principal constituent
2224/45805	Gallium (Ga) as principal constituent	2224/45873	Rhodium (Rh) as principal constituent
2224/45809	Indium (In) as principal constituent	2224/45876	Ruthenium (Ru) as principal constituent
2224/45811	Tin (Sn) as principal constituent	2224/45878	Iridium (Ir) as principal constituent
2224/45813	Bismuth (Bi) as principal constituent	2224/45879	Niobium (Nb) as principal constituent
2224/45814	Thallium (Tl) as principal constituent	2224/4588	Molybdenum (Mo) as principal constituent
2224/45816	Lead (Pb) as principal constituent	2224/45881	Tantalum (Ta) as principal constituent
2224/45817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45883	Rhenium (Re) as principal constituent
2224/45818	Zinc (Zn) as principal constituent	2224/45884	Tungsten (W) as principal constituent
2224/4582	Antimony (Sb) as principal constituent	2224/45886	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45823	Magnesium (Mg) as principal constituent	2224/45887	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45824	Aluminium (Al) as principal constituent	2224/45888	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/45838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/4589	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45839	Silver (Ag) as principal constituent	2224/45891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45844	Gold (Au) as principal constituent	2224/45893	with a principal constituent of the material being a solid not provided for in groups H01L 2224/458 - H01L 2224/45891 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45847	Copper (Cu) as principal constituent	2224/45894	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/458 - H01L 2224/45891
2224/45849	Manganese (Mn) as principal constituent	2224/45895	with a principal constituent of the material being a gas not provided for in groups H01L 2224/458 - H01L 2224/45891
2224/45855	Nickel (Ni) as principal constituent	2224/45898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45857	Cobalt (Co) as principal constituent	2224/45899	Coating material
2224/4586	Iron (Fe) as principal constituent	2224/459	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45863	the principal constituent melting at a temperature of greater than 1550°C		
2224/45864	Palladium (Pd) as principal constituent		
2224/45866	Titanium (Ti) as principal constituent		
2224/45869	Platinum (Pt) as principal constituent		
2224/4587	Zirconium (Zr) as principal constituent		

2224/45901	the principal constituent melting at a temperature of less than 400°C	2224/45978	Iridium (Ir) as principal constituent
2224/45905	Gallium (Ga) as principal constituent	2224/45979	Niobium (Nb) as principal constituent
2224/45909	Indium (In) as principal constituent	2224/4598	Molybdenum (Mo) as principal constituent
2224/45911	Tin (Sn) as principal constituent	2224/45981	Tantalum (Ta) as principal constituent
2224/45913	Bismuth (Bi) as principal constituent	2224/45983	Rhenium (Re) as principal constituent
2224/45914	Thallium (Tl) as principal constituent	2224/45984	Tungsten (W) as principal constituent
2224/45916	Lead (Pb) as principal constituent	2224/45986	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45987	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45918	Zinc (Zn) as principal constituent	2224/45988	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4592	Antimony (Sb) as principal constituent	2224/4599	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45923	Magnesium (Mg) as principal constituent	2224/45991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45924	Aluminium (Al) as principal constituent	2224/45993	with a principal constituent of the material being a solid not provided for in groups H01L 2224/459 - H01L 2224/45991 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45994	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/459 - H01L 2224/45991
2224/45939	Silver (Ag) as principal constituent	2224/45995	with a principal constituent of the material being a gas not provided for in groups H01L 2224/459 - H01L 2224/45991
2224/45944	Gold (Au) as principal constituent	2224/45998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45947	Copper (Cu) as principal constituent	2224/45999	Shape or distribution of the fillers
2224/45949	Manganese (Mn) as principal constituent	2224/46	of a plurality of wire connectors
2224/45955	Nickel (Ni) as principal constituent	2224/47	Structure, shape, material or disposition of the wire connectors after the connecting process
2224/45957	Cobalt (Co) as principal constituent	2224/48	of an individual wire connector
2224/4596	Iron (Fe) as principal constituent	2224/4801	Structure
2224/45963	the principal constituent melting at a temperature of greater than 1550°C	2224/48011	Length
2224/45964	Palladium (Pd) as principal constituent	2224/4805	Shape
2224/45966	Titanium (Ti) as principal constituent	2224/4807	of bonding interfaces, e.g. interlocking features
2224/45969	Platinum (Pt) as principal constituent	2224/4809	Loop shape
2224/4597	Zirconium (Zr) as principal constituent	2224/48091	Arched
2224/45971	Chromium (Cr) as principal constituent	2224/48092	Helix
2224/45972	Vanadium (V) as principal constituent	2224/48095	Kinked
2224/45973	Rhodium (Rh) as principal constituent		
2224/45976	Ruthenium (Ru) as principal constituent		

2224/48096		the kinked part being in proximity to the bonding area on the semiconductor or solid-state body	2224/48155		the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/48097		the kinked part being in proximity to the bonding area outside the semiconductor or solid-state body	2224/48157		connecting the wire to a bond pad of the item
2224/481		Disposition	2224/48158		the bond pad being disposed in a recess of the surface of the item
2224/48101		Connecting bonding areas at the same height, e.g. horizontal bond	2224/48159		the bond pad protruding from the surface of the item
2224/48105		Connecting bonding areas at different heights	2224/4816		connecting the wire to a pin of the item
2224/48106		the connector being orthogonal to a side surface of the semiconductor or solid-state body, e.g. parallel layout	2224/48163		connecting the wire to a potential ring of the item
2224/48108		the connector not being orthogonal to a side surface of the semiconductor or solid-state body, e.g. fanned-out connectors, radial layout	2224/48165		connecting the wire to a via metallisation of the item
2224/4811		Connecting to a bonding area of the semiconductor or solid-state body located at the far end of the body with respect to the bonding area outside the semiconductor or solid-state body	2224/48175		the item being metallic
2224/48111		the wire connector extending above another semiconductor or solid-state body	2224/48177		connecting the wire to a bond pad of the item
2224/4813		Connecting within a semiconductor or solid-state body, i.e. fly wire, bridge wire	2224/48178		the bond pad being disposed in a recess of the surface of the item
2224/48132		with an intermediate bond, e.g. continuous wire daisy chain	2224/48179		the bond pad protruding from the surface of the item
2224/48135		Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/48183		connecting the wire to a potential ring of the item
2224/48137		the bodies being arranged next to each other, e.g. on a common substrate	2224/48195		the item being a discrete passive component
2224/48138		the wire connector connecting to a bonding area disposed in a recess of the surface	2224/48221		the body and the item being stacked
2224/48139		with an intermediate bond, e.g. continuous wire daisy chain	2224/48225		the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/4814		the wire connector connecting to a bonding area protruding from the surface	2224/48227		connecting the wire to a bond pad of the item
2224/48141		the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements	2224/48228		the bond pad being disposed in a recess of the surface of the item
2224/48145		the bodies being stacked	2224/48229		the bond pad protruding from the surface of the item
2224/48147		with an intermediate bond, e.g. continuous wire daisy chain	2224/4823		connecting the wire to a pin of the item
2224/48148		the wire connector connecting to a bonding area disposed in a recess of the surface	2224/48233		connecting the wire to a potential ring of the item
2224/48149		the wire connector connecting to a bonding area protruding from the surface	2224/48235		connecting the wire to a via metallisation of the item
2224/48151		Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive	2224/48237		connecting the wire to a die pad of the item
2224/48153		the body and the item being arranged next to each other, e.g. on a common substrate	2224/4824		Connecting between the body and an opposite side of the item with respect to the body
			2224/48245		the item being metallic
			2224/48247		connecting the wire to a bond pad of the item
			2224/48248		the bond pad being disposed in a recess of the surface of the item
			2224/48249		the bond pad protruding from the surface of the item
			2224/48253		connecting the wire to a potential ring of the item
			2224/48257		connecting the wire to a die pad of the item
			2224/4826		Connecting between the body and an opposite side of the item with respect to the body

2224/48265		the item being a discrete passive component	2224/4849		outside the semiconductor or solid-state body
2224/484		Connecting portions	2224/48491		being an additional member attached to the bonding area through an adhesive or solder, e.g. buffer pad
2224/4845		Details of ball bonds	2224/48496		not being interposed between the wire connector and the bonding area
2224/48451		Shape	2224/48499		Material of the auxiliary connecting means
2224/48453		of the interface with the bonding area	2224/485		Material
2224/48455		Details of wedge bonds	2224/48505		at the bonding interface
2224/48456		Shape	2224/48506		comprising an eutectic alloy
2224/48458		of the interface with the bonding area	2224/48507		comprising an intermetallic compound
2224/4846		with multiple bonds on the same bonding area	2224/4851		Morphology of the connecting portion, e.g. grain size distribution
2224/48463		the connecting portion on the bonding area of the semiconductor or solid-state body being a ball bond	2224/48511		Heat affected zone [HAZ]
2224/48464		the other connecting portion not on the bonding area also being a ball bond, i.e. ball-to-ball	2224/4852		Bonding interface between the connecting portion and the bonding area
2224/48465		the other connecting portion not on the bonding area being a wedge bond, i.e. ball-to-wedge, regular stitch	2224/48599		Principal constituent of the connecting portion of the wire connector being Gold (Au)
2224/4847		the connecting portion on the bonding area of the semiconductor or solid-state body being a wedge bond	2224/486		with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48471		the other connecting portion not on the bonding area being a ball bond, i.e. wedge-to-ball, reverse stitch	2224/48601		the principal constituent melting at a temperature of less than 400°C
2224/48472		the other connecting portion not on the bonding area also being a wedge bond, i.e. wedge-to-wedge	2224/48605		Gallium (Ga) as principal constituent
2224/48475		connected to auxiliary connecting means on the bonding areas, e.g. pre-ball, wedge-on-ball, ball-on-ball	2224/48609		Indium (In) as principal constituent
2224/48476		between the wire connector and the bonding area	2224/48611		Tin (Sn) as principal constituent
2224/48477		being a pre-ball (i.e. a ball formed by capillary bonding)	2224/48613		Bismuth (Bi) as principal constituent
2224/48478		the connecting portion being a wedge bond, i.e. wedge on pre-ball	2224/48614		Thallium (Tl) as principal constituent
2224/48479		on the semiconductor or solid-state body	2224/48616		Lead (Pb) as principal constituent
2224/4848		outside the semiconductor or solid-state body	2224/48617		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48481		the connecting portion being a ball bond, i.e. ball on pre-ball	2224/48618		Zinc (Zn) as principal constituent
2224/48482		on the semiconductor or solid-state body	2224/4862		Antimony (Sb) as principal constituent
2224/48483		outside the semiconductor or solid-state body	2224/48623		Magnesium (Mg) as principal constituent
2224/48484		being a plurality of pre-balls disposed side-to-side	2224/48624		Aluminium (Al) as principal constituent
2224/48485		the connecting portion being a wedge bond, i.e. wedge on pre-ball	2224/48638		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48486		on the semiconductor or solid-state body	2224/48639		Silver (Ag) as principal constituent
2224/48487		outside the semiconductor or solid-state body			
2224/48488		the connecting portion being a ball bond, i.e. ball on pre-ball			
2224/48489		on the semiconductor or solid-state body			

2224/48644	Gold (Au) as principal constituent	2224/48694	with a principal constituent of the bonding area being a liquid not provided for in groups H01L 2224/486 - H01L 2224/4869
2224/48647	Copper (Cu) as principal constituent	2224/48698	with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns
2224/48649	Manganese (Mn) as principal constituent	2224/48699	Principal constituent of the connecting portion of the wire connector being Aluminium (Al)
2224/48655	Nickel (Ni) as principal constituent	2224/487	with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48657	Cobalt (Co) as principal constituent	2224/48701	the principal constituent melting at a temperature of less than 400°C
2224/4866	Iron (Fe) as principal constituent	2224/48705	Gallium (Ga) as principal constituent
2224/48663	the principal constituent melting at a temperature of greater than 1550°C	2224/48709	Indium (In) as principal constituent
2224/48664	Palladium (Pd) as principal constituent	2224/48711	Tin (Sn) as principal constituent
2224/48666	Titanium (Ti) as principal constituent	2224/48713	Bismuth (Bi) as principal constituent
2224/48669	Platinum (Pt) as principal constituent	2224/48714	Thallium (Tl) as principal constituent
2224/4867	Zirconium (Zr) as principal constituent	2224/48716	Lead (Pb) as principal constituent
2224/48671	Chromium (Cr) as principal constituent	2224/48717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48672	Vanadium (V) as principal constituent	2224/48718	Zinc (Zn) as principal constituent
2224/48673	Rhodium (Rh) as principal constituent	2224/4872	Antimony (Sb) as principal constituent
2224/48678	Iridium (Ir) as principal constituent	2224/48723	Magnesium (Mg) as principal constituent
2224/48679	Niobium (Nb) as principal constituent	2224/48724	Aluminium (Al) as principal constituent
2224/4868	Molybdenum (Mo) as principal constituent	2224/48738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48681	Tantalum (Ta) as principal constituent	2224/48739	Silver (Ag) as principal constituent
2224/48683	Rhenium (Re) as principal constituent	2224/48744	Gold (Au) as principal constituent
2224/48684	Tungsten (W) as principal constituent	2224/48747	Copper (Cu) as principal constituent
2224/48686	with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material	2224/48749	Manganese (Mn) as principal constituent
2224/48687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/48755	Nickel (Ni) as principal constituent
2224/48688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/48757	Cobalt (Co) as principal constituent
2224/4869	with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/4876	Iron (Fe) as principal constituent
2224/48691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		
2224/48693	with a principal constituent of the bonding area being a solid not provided for in groups H01L 2224/486 - H01L 2224/4869 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond		

2224/48763	the principal constituent melting at a temperature of greater than 1550°C	2224/488	with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48764	Palladium (Pd) as principal constituent	2224/48801	the principal constituent melting at a temperature of less than 400°C
2224/48766	Titanium (Ti) as principal constituent	2224/48805	Gallium (Ga) as principal constituent
2224/48769	Platinum (Pt) as principal constituent	2224/48809	Indium (In) as principal constituent
2224/4877	Zirconium (Zr) as principal constituent	2224/48811	Tin (Sn) as principal constituent
2224/48771	Chromium (Cr) as principal constituent	2224/48813	Bismuth (Bi) as principal constituent
2224/48772	Vanadium (V) as principal constituent	2224/48814	Thallium (Tl) as principal constituent
2224/48773	Rhodium (Rh) as principal constituent	2224/48816	Lead (Pb) as principal constituent
2224/48778	Iridium (Ir) as principal constituent	2224/48817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48779	Niobium (Nb) as principal constituent	2224/48818	Zinc (Zn) as principal constituent
2224/4878	Molybdenum (Mo) as principal constituent	2224/4882	Antimony (Sb) as principal constituent
2224/48781	Tantalum (Ta) as principal constituent	2224/48823	Magnesium (Mg) as principal constituent
2224/48783	Rhenium (Re) as principal constituent	2224/48824	Aluminium (Al) as principal constituent
2224/48784	Tungsten (W) as principal constituent	2224/48838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48786	with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material	2224/48839	Silver (Ag) as principal constituent
2224/48787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/48844	Gold (Au) as principal constituent
2224/48788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/48847	Copper (Cu) as principal constituent
2224/4879	with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/48849	Manganese (Mn) as principal constituent
2224/48791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/48855	Nickel (Ni) as principal constituent
2224/48793	with a principal constituent of the bonding area being a solid not provided for in groups H01L 2224/487 - H01L 2224/4879 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/48857	Cobalt (Co) as principal constituent
2224/48794	with a principal constituent of the bonding area being a liquid not provided for in groups H01L 2224/487 - H01L 2224/4879	2224/4886	Iron (Fe) as principal constituent
2224/48798	with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns	2224/48863	the principal constituent melting at a temperature of greater than 1550°C
2224/48799	Principal constituent of the connecting portion of the wire connector being Copper (Cu)	2224/48864	Palladium (Pd) as principal constituent
		2224/48866	Titanium (Ti) as principal constituent
		2224/48869	Platinum (Pt) as principal constituent
		2224/4887	Zirconium (Zr) as principal constituent
		2224/48871	Chromium (Cr) as principal constituent

2224/48872		Vanadium (V) as principal constituent	2224/49051		Connectors having different shapes
2224/48873		Rhodium (Rh) as principal constituent	2224/49052		Different loop heights
2224/48878		Iridium (Ir) as principal constituent	2224/4909		Loop shape arrangement
2224/48879		Niobium (Nb) as principal constituent	2224/49095		parallel in plane
2224/4888		Molybdenum (Mo) as principal constituent	2224/49096		horizontal
2224/48881		Tantalum (Ta) as principal constituent	2224/49097		vertical
2224/48883		Rhenium (Re) as principal constituent	2224/491		Disposition
2224/48884		Tungsten (W) as principal constituent	2224/49105		Connecting at different heights
2224/48886		with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material	2224/49107		on the semiconductor or solid-state body
2224/48887		Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/49109		outside the semiconductor or solid-state body
2224/48888		Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/4911		the connectors being bonded to at least one common bonding area, e.g. daisy chain
2224/4889		with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/49111		the connectors connecting two common bonding areas, e.g. Litz or braid wires
2224/48891		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/49112		the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body, e.g. diverging wires
2224/48893		with a principal constituent of the bonding area being a solid not provided for in groups H01L 2224/488 - H01L 2224/4889 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/49113		the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body, e.g. converging wires
2224/48894		with a principal constituent of the bonding area being a liquid not provided for in groups H01L 2224/488 - H01L 2224/4889	2224/4912		Layout
2224/48898		with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns	2224/4917		Crossed wires
2224/4899		Auxiliary members for wire connectors, e.g. flow-barriers, reinforcing structures, spacers, alignment aids	2224/49171		Fan-out arrangements
2224/48991		being formed on the semiconductor or solid-state body to be connected	2224/49173		Radial fan-out arrangements
2224/48992		Reinforcing structures	2224/49174		Stacked arrangements
2224/48993		Alignment aids	2224/49175		Parallel arrangements
2224/48996		being formed on an item to be connected not being a semiconductor or solid-state body	2224/49176		Wire connectors having the same loop shape and height
2224/48997		Reinforcing structures	2224/49177		Combinations of different arrangements
2224/48998		Alignment aids	2224/49179		Corner adaptations, i.e. disposition of the wire connectors at the corners of the semiconductor or solid-state body
2224/49		of a plurality of wire connectors	2224/4918		being disposed on at least two different sides of the body, e.g. dual array
2224/4901		Structure	2224/494		Connecting portions
2224/4903		Connectors having different sizes, e.g. different diameters	2224/4941		the connecting portions being stacked
2224/4905		Shape	2224/4942		Ball bonds
			2224/49421		on the semiconductor or solid-state body
			2224/49422		outside the semiconductor or solid-state body
			2224/49425		Wedge bonds
			2224/49426		on the semiconductor or solid-state body
			2224/49427		outside the semiconductor or solid-state body
			2224/49429		Wedge and ball bonds
			2224/4943		the connecting portions being staggered
			2224/49431		on the semiconductor or solid-state body
			2224/49433		outside the semiconductor or solid-state body

- 2224/4945 Wire connectors having connecting portions of different types on the semiconductor or solid-state body, e.g. regular and reverse stitches
- 2224/495 Material
- 2224/49505 Connectors having different materials
- 2224/50 . . . Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto
- 2224/63 . . . Connectors not provided for in any of the groups [H01L 2224/10](#) - [H01L 2224/50](#) and subgroups; Manufacturing methods related thereto
- 2224/64 . . . Manufacturing methods
- 2224/65 . . . Structure, shape, material or disposition of the connectors prior to the connecting process
- 2224/66 of an individual connector
- 2224/67 of a plurality of connectors
- 2224/68 . . . Structure, shape, material or disposition of the connectors after the connecting process
- 2224/69 of an individual connector
- 2224/70 of a plurality of connectors
- 2224/71 . . . Means for bonding not being attached to, or not being formed on, the surface to be connected
- 2224/72 . . . Detachable connecting means consisting of mechanical auxiliary parts connecting the device, e.g. pressure contacts using springs or clips
- 2224/73 . . . Means for bonding being of different types provided for in two or more of groups [H01L 2224/10](#), [H01L 2224/18](#), [H01L 2224/26](#), [H01L 2224/34](#), [H01L 2224/42](#), [H01L 2224/50](#), [H01L 2224/63](#), [H01L 2224/71](#)
- 2224/731 . . . Location prior to the connecting process
- 2224/73101 on the same surface
- 2224/73103 Bump and layer connectors
- 2224/73104 the bump connector being embedded into the layer connector
- 2224/73151 on different surfaces
- 2224/73153 Bump and layer connectors
- 2224/732 . . . Location after the connecting process
- 2224/73201 on the same surface
- 2224/73203 Bump and layer connectors
- 2224/73204 the bump connector being embedded into the layer connector
- 2224/73205 Bump and strap connectors
- 2224/73207 Bump and wire connectors
- 2224/73209 Bump and HDI connectors
- 2224/73211 Bump and TAB connectors
- 2224/73213 Layer and strap connectors
- 2224/73215 Layer and wire connectors
- 2224/73217 Layer and HDI connectors
- 2224/73219 Layer and TAB connectors
- 2224/73221 Strap and wire connectors
- 2224/73223 Strap and HDI connectors
- 2224/73225 Strap and TAB connectors
- 2224/73227 Wire and HDI connectors
- 2224/73229 Wire and TAB connectors
- 2224/73231 HDI and TAB connectors
- 2224/73251 on different surfaces
- 2224/73253 Bump and layer connectors
- 2224/73255 Bump and strap connectors
- 2224/73257 Bump and wire connectors
- 2224/73259 Bump and HDI connectors
- 2224/73261 Bump and TAB connectors
- 2224/73263 Layer and strap connectors
- 2224/73265 Layer and wire connectors
- 2224/73267 Layer and HDI connectors
- 2224/73269 Layer and TAB connectors
- 2224/73271 Strap and wire connectors
- 2224/73273 Strap and HDI connectors
- 2224/73275 Strap and TAB connectors
- 2224/73277 Wire and HDI connectors
- 2224/73279 Wire and TAB connectors
- 2224/73281 HDI and TAB connectors
- 2224/74 . . . Apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies and for methods related thereto
- 2224/741 . . . Apparatus for manufacturing means for bonding, e.g. connectors
- 2224/742 Apparatus for manufacturing bump connectors
- 2224/743 Apparatus for manufacturing layer connectors
- 2224/744 Apparatus for manufacturing strap connectors
- 2224/745 Apparatus for manufacturing wire connectors
- 2224/749 Tools for reworking, e.g. for shaping
- 2224/75 . . . Apparatus for connecting with bump connectors or layer connectors
- 2224/75001 Calibration means
- 2224/7501 Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
- 2224/751 Means for controlling the bonding environment, e.g. valves, vacuum pumps
- 2224/75101 Chamber
- 2224/75102 Vacuum chamber
- 2224/7511 High pressure chamber
- 2224/7515 Means for applying permanent coating, e.g. in-situ coating
- 2224/75151 Means for direct writing
- 2224/75152 Syringe
- 2224/75153 integrated into the bonding head
- 2224/75155 Jetting means, e.g. ink jet
- 2224/75158 including a laser
- 2224/75161 Means for screen printing, e.g. roller, squeegee, screen stencil
- 2224/7517 Means for applying a preform, e.g. laminator
- 2224/75171 including a vacuum-bag
- 2224/7518 Means for blanket deposition
- 2224/75181 for spin coating, i.e. spin coater
- 2224/75182 for curtain coating
- 2224/75183 for immersion coating, i.e. bath
- 2224/75184 for spray coating, i.e. nozzle
- 2224/75185 Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
- 2224/75186 Means for sputtering, e.g. target
- 2224/75187 Means for evaporation
- 2224/75188 Means for chemical vapour deposition [CVD], e.g. for laser CVD
- 2224/75189 Means for plating, e.g. for electroplating, electroless plating
- 2224/752 Protection means against electrical discharge
- 2224/7525 Means for applying energy, e.g. heating means
- 2224/75251 in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/75252 in the upper part of the bonding apparatus, e.g. in the bonding head
- 2224/75253 adapted for localised heating

2224/7526		Polychromatic heating lamp	2224/75501		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75261		Laser	2224/75502		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75262		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7555	. . .	Mechanical means, e.g. for planarising, pressing, stamping
2224/75263		in the upper part of the bonding apparatus, e.g. in the bonding head	2224/756	. . .	Means for supplying the connector to be connected in the bonding apparatus
2224/75264		by induction heating, i.e. coils	2224/75601		Storing means
2224/75265		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75611		Feeding means
2224/75266		in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75621		Holding means
2224/75267		Flame torch, e.g. hydrogen torch	2224/7565	. . .	Means for transporting the components to be connected
2224/75268		Discharge electrode	2224/75651		Belt conveyor
2224/75269		Shape of the discharge electrode	2224/75652		Chain conveyor
2224/7527		Material of the discharge electrode	2224/75653		Vibrating conveyor
2224/75271		Circuitry of the discharge electrode	2224/75654		Pneumatic conveyor
2224/75272		Oven	2224/75655		in a fluid
2224/7528		Resistance welding electrodes, i.e. for ohmic heating	2224/757	. . .	Means for aligning
2224/75281		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75701		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75282		in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75702		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75283		by infrared heating, e.g. infrared heating lamp	2224/75703		Mechanical holding means
2224/753		by means of pressure	2224/75704		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75301		Bonding head	2224/75705		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75302		Shape	2224/75723		Electrostatic holding means
2224/75303		of the pressing surface	2224/75724		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75304		being curved	2224/75725		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75305		comprising protrusions	2224/75733		Magnetic holding means
2224/7531		of other parts	2224/75734		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75312		Material	2224/75735		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75313		Removable bonding head	2224/75743		Suction holding means
2224/75314		Auxiliary members on the pressing surface	2224/75744		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75315		Elastomer inlay	2224/75745		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75316		with retaining mechanisms	2224/75753		Means for optical alignment, e.g. sensors
2224/75317		Removable auxiliary member	2224/75754		Guiding structures
2224/75318		Shape of the auxiliary member	2224/75755		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7532		Material of the auxiliary member	2224/75756		in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75343		by ultrasonic vibrations	2224/758	. . .	Means for moving parts
2224/75344		Eccentric cams	2224/75801		Lower part of the bonding apparatus, e.g. XY table
2224/75345		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75802		Rotational mechanism
2224/75346		in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75803		Pivoting mechanism
2224/75347		Piezoelectric transducers	2224/75804		Translational mechanism
2224/75348		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75821		Upper part of the bonding apparatus, i.e. bonding head
2224/75349		in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75822		Rotational mechanism
2224/7535		Stable and mobile yokes	2224/75823		Pivoting mechanism
2224/75351		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75824		Translational mechanism
2224/75352		in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75841		of the bonding head
2224/75353		Ultrasonic horns	2224/75842		Rotational mechanism
2224/75354		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75843		Pivoting mechanism
2224/75355		Design, e.g. of the wave guide			
2224/755	. . .	Cooling means			

2224/759	. . .	Means for monitoring the connection process	2224/76265		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75901		using a computer, e.g. fully- or semi-automatic bonding	2224/76266		in the upper part of the bonding apparatus
2224/7592		Load or pressure adjusting means, e.g. sensors	2224/76267		Flame torch, e.g. hydrogen torch
2224/75925		Vibration adjusting means, e.g. sensors	2224/76268		Discharge electrode
2224/7595	. . .	Means for forming additional members	2224/76269		Shape of the discharge electrode
2224/7598	. . .	specially adapted for batch processes	2224/7627		Material of the discharge electrode
2224/75981	. . .	Apparatus chuck	2224/76271		Circuitry of the discharge electrode
2224/75982		Shape	2224/76272		Oven
2224/75983		of the mounting surface	2224/7628		Resistance welding electrodes, i.e. for ohmic heating
2224/75984		of other portions	2224/76281		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75985		Material	2224/76282		in the upper part of the bonding apparatus
2224/75986		Auxiliary members on the pressing surface	2224/76283		by infrared heating, e.g. infrared heating lamp
2224/75987		Shape of the auxiliary member	2224/763		by means of pressure
2224/75988		Material of the auxiliary member	2224/76301		Pressing head
2224/76	. .	Apparatus for connecting with build-up interconnects	2224/76302		Shape
2224/76001	. . .	Calibration means	2224/76303		of the pressing surface
2224/7601	. . .	Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma	2224/76304		being curved
2224/761	. . .	Means for controlling the bonding environment, e.g. valves, vacuum pumps	2224/76305		comprising protrusions
2224/76101		Chamber	2224/7631		of other parts
2224/76102		Vacuum chamber	2224/76312		Material
2224/7611		High pressure chamber	2224/76313		Removable pressing head
2224/7615	. . .	Means for depositing	2224/76314		Auxiliary members on the pressing surface
2224/76151		Means for direct writing	2224/76315		Elastomer inlay
2224/76152		Syringe	2224/76316		with retaining mechanisms
2224/76155		Jetting means, e.g. ink jet	2224/76317		Removable auxiliary member
2224/76158		including a laser	2224/76318		Shape of the auxiliary member
2224/76161		Means for screen printing, e.g. roller, squeegee, screen stencil	2224/7632		Material of the auxiliary member
2224/7617		Means for applying a preform, e.g. laminator	2224/76343		by ultrasonic vibrations
2224/76171		including a vacuum-bag	2224/76344		Eccentric cams
2224/7618		Means for blanket deposition	2224/76345		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76181		for spin coating, i.e. spin coater	2224/76346		in the upper part of the bonding apparatus
2224/76182		for curtain coating	2224/76347		Piezoelectric transducers
2224/76183		for immersion coating, i.e. bath	2224/76348		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76184		for spray coating, i.e. nozzle	2224/76349		in the upper part of the bonding apparatus
2224/76185		Means for physical vapour deposition [PVD]	2224/7635		Stable and mobile yokes
2224/76186		Means for sputtering, e.g. target	2224/76351		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76187		Means for evaporation	2224/76352		in the upper part of the bonding apparatus
2224/76188		Means for chemical vapour deposition [CVD], e.g. for laser CVD	2224/76353		Ultrasonic horns
2224/76189		Means for plating, e.g. for electroplating, electroless plating	2224/76354		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/762	. . .	Protection means against electrical discharge	2224/76355		Design, e.g. of the wave guide
2224/7625	. . .	Means for applying energy, e.g. heating means	2224/765	. . .	Cooling means
2224/76251		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/76501		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76252		in the upper part of the bonding apparatus	2224/76502		in the upper part of the bonding apparatus
2224/76253		adapted for localised heating	2224/7655	. . .	Mechanical means, e.g. for planarising, pressing, stamping
2224/7626		Polychromatic heating lamp	2224/76552		for drilling
2224/76261		Laser	2224/76554		for abrasive blasting, e.g. sand blasting, wet blasting, hydro-blasting, dry ice blasting
2224/76262		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/766	. . .	Means for supplying the material of the interconnect
2224/76263		in the upper part of the bonding apparatus			
2224/76264		by induction heating, i.e. coils			

2224/76601		Storing means	2224/76986		Auxiliary members on the pressing surface
2224/76611		Feeding means	2224/76987		Shape of the auxiliary member
2224/76621		Holding means	2224/76988		Material of the auxiliary member
2224/7665	. . .	Means for transporting the components to be connected	2224/77	. .	Apparatus for connecting with strap connectors
2224/76651		Belt conveyor	2224/77001	. . .	Calibration means
2224/76652		Chain conveyor	2224/7701	. . .	Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
2224/76653		Vibrating conveyor	2224/771	. . .	Means for controlling the bonding environment, e.g. valves, vacuum pumps
2224/76654		Pneumatic conveyor	2224/77101		Chamber
2224/76655		in a fluid	2224/77102		Vacuum chamber
2224/767	. . .	Means for aligning	2224/7711		High pressure chamber
2224/76701		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7715	. . .	Means for applying permanent coating, e.g. in-situ coating
2224/76702		in the upper part of the bonding apparatus	2224/77151		Means for direct writing
2224/76703		Mechanical holding means	2224/77152		Syringe
2224/76704		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/77153		integrated into the capillary or wedge
2224/76705		in the upper part of the bonding apparatus	2224/77155		Jetting means, e.g. ink jet
2224/76723		Electrostatic holding means	2224/77158		including a laser
2224/76724		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/77161		Means for screen printing, e.g. roller, squeegee, screen stencil
2224/76725		in the upper part of the bonding apparatus	2224/7717		Means for applying a preform, e.g. laminator
2224/76733		Magnetic holding means	2224/77171		including a vacuum-bag
2224/76734		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7718		Means for blanket deposition
2224/76735		in the upper part of the bonding apparatus	2224/77181		for spin coating, i.e. spin coater
2224/76743		Suction holding means	2224/77182		for curtain coating
2224/76744		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/77183		for immersion coating, i.e. bath
2224/76745		in the upper part of the bonding apparatus	2224/77184		for spray coating, i.e. nozzle
2224/76753		Means for optical alignment, e.g. sensors	2224/77185		Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/76754		Guiding structures	2224/77186		Means for sputtering, e.g. target
2224/76755		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/77187		Means for evaporation
2224/76756		in the upper part of the bonding apparatus	2224/77188		Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/768	. . .	Means for moving parts	2224/77189		Means for plating, e.g. for electroplating, electroless plating
2224/76801		Lower part of the bonding apparatus, e.g. XY table	2224/772	. . .	Protection means against electrical discharge
2224/76802		Rotational mechanism	2224/7725	. . .	Means for applying energy, e.g. heating means
2224/76803		Pivoting mechanism	2224/77251		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76804		Translational mechanism	2224/77252		in the upper part of the bonding apparatus, e.g. in the wedge
2224/76821		Upper part of the bonding apparatus, i.e. bonding head	2224/77253		adapted for localised heating
2224/76822		Rotational mechanism	2224/7726		Polychromatic heating lamp
2224/76823		Pivoting mechanism	2224/77261		Laser
2224/76824		Translational mechanism	2224/77262		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76841		of the bonding head	2224/77263		in the upper part of the bonding apparatus, e.g. in the wedge
2224/76842		Rotational mechanism	2224/77264		by induction heating, i.e. coils
2224/76843		Pivoting mechanism	2224/77265		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/769	. . .	Means for monitoring the connection process	2224/77266		in the upper part of the bonding apparatus, e.g. in the wedge
2224/76901		using a computer, e.g. fully- or semi-automatic bonding	2224/77267		Flame torch, e.g. hydrogen torch
2224/7692		Load or pressure adjusting means, e.g. sensors	2224/77268		Discharge electrode
2224/76925		Vibration adjusting means, e.g. sensors	2224/77269		Shape of the discharge electrode
2224/7695	. . .	Means for forming additional members	2224/7727		Material of the discharge electrode
2224/7698	. . .	specially adapted for batch processes	2224/77271		Circuitry of the discharge electrode
2224/76981	. . .	Apparatus chuck	2224/77272		Oven
2224/76982		Shape			
2224/76983		of the mounting surface			
2224/76984		of other portions			
2224/76985		Material			

2224/7728		Resistance welding electrodes, i.e. for ohmic heating	2224/77655		in a fluid
2224/77281		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/777	. . .	Means for aligning
2224/77282		in the upper part of the bonding apparatus, e.g. in the wedge	2224/77701		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77283		by infrared heating, e.g. infrared heating lamp	2224/77702		in the upper part of the bonding apparatus, e.g. in the wedge
2224/773		by means of pressure	2224/77703		Mechanical holding means
2224/77313		Wedge	2224/77704		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77314		Shape	2224/77705		in the upper part of the bonding apparatus, e.g. in the wedge
2224/77315		of the pressing surface, e.g. tip or head	2224/77723		Electrostatic holding means
2224/77316		comprising protrusions	2224/77724		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77317		of other portions	2224/77725		in the upper part of the bonding apparatus, e.g. in the wedge
2224/77318		inside the capillary	2224/77733		Magnetic holding means
2224/77319		outside the capillary	2224/77734		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7732		Removable wedge	2224/77735		in the upper part of the bonding apparatus, e.g. in the wedge
2224/77321		Material	2224/77743		Suction holding means
2224/77325		Auxiliary members on the pressing surface	2224/77744		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77326		Removable auxiliary member	2224/77745		in the upper part of the bonding apparatus, e.g. in the wedge
2224/77327		Shape of the auxiliary member	2224/77753		Means for optical alignment, e.g. sensors
2224/77328		Material of the auxiliary member	2224/77754		Guiding structures
2224/77343		by ultrasonic vibrations	2224/77755		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77344		Eccentric cams	2224/77756		in the upper part of the bonding apparatus, e.g. in the wedge
2224/77345		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/778	. . .	Means for moving parts
2224/77346		in the upper part of the bonding apparatus, e.g. in the wedge	2224/77801		Lower part of the bonding apparatus, e.g. XY table
2224/77347		Piezoelectric transducers	2224/77802		Rotational mechanism
2224/77348		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/77803		Pivoting mechanism
2224/77349		in the upper part of the bonding apparatus, e.g. in the wedge	2224/77804		Translational mechanism
2224/7735		Stable and mobile yokes	2224/77821		Upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge
2224/77351		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/77822		Rotational mechanism
2224/77352		in the upper part of the bonding apparatus, e.g. in the wedge	2224/77823		Pivoting mechanism
2224/77353		Ultrasonic horns	2224/77824		Translational mechanism
2224/77354		in the lower part of the bonding apparatus, e.g. in the mounting chuck	2224/77841		of the pressing portion, e.g. tip or head
2224/77355		Design, e.g. of the wave guide	2224/77842		Rotational mechanism
2224/775	. . .	Cooling means	2224/77843		Pivoting mechanism
2224/77501		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/779	. . .	Means for monitoring the connection process
2224/77502		in the upper part of the bonding apparatus, e.g. in the wedge	2224/77901		using a computer, e.g. fully- or semi-automatic bonding
2224/7755	. . .	Mechanical means, e.g. for severing, pressing, stamping	2224/7792		Load or pressure adjusting means, e.g. sensors
2224/776	. . .	Means for supplying the connector to be connected in the bonding apparatus	2224/77925		Vibration adjusting means, e.g. sensors
2224/77601		Storing means	2224/7795	. . .	Means for forming additional members
2224/77611		Feeding means	2224/7798	. . .	specially adapted for batch processes
2224/77621		Holding means, e.g. wire claspers	2224/77981	. . .	Apparatus chuck
2224/77631		Means for wire tension adjustments	2224/77982		Shape
2224/7765	. . .	Means for transporting the components to be connected	2224/77983		of the mounting surface
2224/77651		Belt conveyor	2224/77984		of other portions
2224/77652		Chain conveyor	2224/77985		Material
2224/77653		Vibrating conveyor	2224/77986		Auxiliary members on the pressing surface
2224/77654		Pneumatic conveyor	2224/77987		Shape of the auxiliary member
			2224/77988		Material of the auxiliary member
			2224/78	. .	Apparatus for connecting with wire connectors

2224/78001	. . .	Calibration means	2224/78316		comprising protrusions
2224/7801	. . .	Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma	2224/78317		of other portions
2224/781	. . .	Means for controlling the bonding environment, e.g. valves, vacuum pumps	2224/78318		inside the capillary
2224/78101		Chamber	2224/78319		outside the capillary
2224/78102		Vacuum chamber	2224/7832		Removable wedge
2224/7811		High pressure chamber	2224/78321		Material
2224/7815	. . .	Means for applying permanent coating, e.g. in-situ coating	2224/78325		Auxiliary members on the pressing surface
2224/782	. . .	Protection means against electrical discharge	2224/78326		Removable auxiliary member
2224/7825	. . .	Means for applying energy, e.g. heating means	2224/78327		Shape of the auxiliary member
2224/78251		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/78328		Material of the auxiliary member
2224/78252		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/78343		by ultrasonic vibrations
2224/78253		adapted for localised heating	2224/78344		Eccentric cams
2224/7826		Polychromatic heating lamp	2224/78345		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78261		Laser	2224/78346		in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78262		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/78347		Piezoelectric transducers
2224/78263		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/78348		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78264		by induction heating, i.e. coils	2224/78349		in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78265		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7835		Stable and mobile yokes
2224/78266		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/78351		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78267		Flame torch, e.g. hydrogen torch	2224/78352		in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78268		Discharge electrode	2224/78353		Ultrasonic horns
2224/78269		Shape of the discharge electrode	2224/78354		in the lower part of the bonding apparatus, e.g. in the mounting chuck
2224/7827		Material of the discharge electrode	2224/78355		Design, e.g. of the wave guide
2224/78271		Circuitry of the discharge electrode	2224/785	. . .	Cooling means
2224/78272		Oven	2224/78501		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7828		Resistance welding electrodes, i.e. for ohmic heating	2224/78502		in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78281		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7855	. . .	Mechanical means, e.g. for severing, pressing, stamping
2224/78282		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/786	. . .	Means for supplying the connector to be connected in the bonding apparatus
2224/78283		by infrared heating, e.g. infrared heating lamp	2224/78601		Storing means
2224/783		by means of pressure	2224/78611		Feeding means
2224/78301		Capillary	2224/78621		Holding means, e.g. wire claspers
2224/78302		Shape	2224/78631		Means for wire tension adjustments
2224/78303		of the pressing surface, e.g. tip or head	2224/7865	. . .	Means for transporting the components to be connected
2224/78304		comprising protrusions	2224/78651		Belt conveyor
2224/78305		of other portions	2224/78652		Chain conveyor
2224/78306		inside the capillary	2224/78653		Vibrating conveyor
2224/78307		outside the capillary	2224/78654		Pneumatic conveyor
2224/78308		Removable capillary	2224/78655		in a fluid
2224/78309		Material	2224/787	. . .	Means for aligning
2224/7831		Auxiliary members on the pressing surface	2224/78701		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78311		Removable auxiliary member	2224/78702		in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78312		Shape of the auxiliary member	2224/78703		Mechanical holding means
2224/78313		Wedge	2224/78704		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78314		Shape			
2224/78315		of the pressing surface, e.g. tip or head			

2224/78705		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/7911		High pressure chamber
2224/78723		Electrostatic holding means	2224/7915		Means for applying permanent coating
2224/78724		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79151		Means for direct writing
2224/78725		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79152		Syringe
2224/78733		Magnetic holding means	2224/79153		integrated into the pressing head
2224/78734		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79155		Jetting means, e.g. ink jet
2224/78735		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79158		including a laser
2224/78743		Suction holding means	2224/79161		Means for screen printing, e.g. roller, squeegee, screen stencil
2224/78744		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7917		Means for applying a preform, e.g. laminator
2224/78745		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79171		including a vacuum-bag
2224/78753		Means for optical alignment, e.g. sensors	2224/7918		Means for blanket deposition
2224/78754		Guiding structures	2224/79181		for spin coating, i.e. spin coater
2224/78755		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79182		for curtain coating
2224/78756		in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79183		for immersion coating, i.e. bath
2224/788		Means for moving parts	2224/79184		for spray coating, i.e. nozzle
2224/78801		Lower part of the bonding apparatus, e.g. XY table	2224/79185		Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/78802		Rotational mechanism	2224/79186		Means for sputtering, e.g. target
2224/78803		Pivoting mechanism	2224/79187		Means for evaporation
2224/78804		Translational mechanism	2224/79188		Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/78821		Upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge	2224/79189		Means for plating, e.g. for electroplating, electroless plating
2224/78822		Rotational mechanism	2224/792		Protection means against electrical discharge
2224/78823		Pivoting mechanism	2224/7925		Means for applying energy, e.g. heating means
2224/78824		Translational mechanism	2224/79251		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78841		of the pressing portion, e.g. tip or head	2224/79252		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/78842		Rotational mechanism	2224/79253		adapted for localised heating
2224/78843		Pivoting mechanism	2224/7926		Polychromatic heating lamp
2224/789		Means for monitoring the connection process	2224/79261		Laser
2224/78901		using a computer, e.g. fully- or semi-automatic bonding	2224/79262		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7892		Load or pressure adjusting means, e.g. sensors	2224/79263		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/78925		Vibration adjusting means, e.g. sensors	2224/79264		by induction heating, i.e. coils
2224/7895		Means for forming additional members	2224/79265		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7898		specially adapted for batch processes	2224/79266		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/78981		Apparatus chuck	2224/79267		Flame torch, e.g. hydrogen torch
2224/78982		Shape	2224/79268		Discharge electrode
2224/78983		of the mounting surface	2224/79269		Shape of the discharge electrode
2224/78984		of other portions	2224/7927		Material of the discharge electrode
2224/78985		Material	2224/79271		Circuitry of the discharge electrode
2224/78986		Auxiliary members on the pressing surface	2224/79272		Oven
2224/78987		Shape of the auxiliary member	2224/7928		Resistance welding electrodes, i.e. for ohmic heating
2224/78988		Material of the auxiliary member	2224/79281		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79		Apparatus for Tape Automated Bonding [TAB]	2224/79282		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79001		Calibration means	2224/79283		by infrared heating, e.g. infrared heating lamp
2224/7901		Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma	2224/793		by means of pressure
2224/791		Means for controlling the bonding environment, e.g. valves, vacuum pumps	2224/79301		Pressing head
2224/79101		Chamber	2224/79302		Shape
2224/79102		Vacuum chamber	2224/79303		of the pressing surface
			2224/79304		being curved
			2224/79305		comprising protrusions

2224/7931		of other parts	2224/79733		Magnetic holding means
2224/79312		Material	2224/79734		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79313		Removable pressing head	2224/79735		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79314		Auxiliary members on the pressing surface	2224/79743		Suction holding means
2224/79315		Elastomer inlay	2224/79744		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79316		with retaining mechanisms	2224/79745		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79317		Removable auxiliary member	2224/79753		Means for optical alignment, e.g. sensors
2224/79318		Shape of the auxiliary member	2224/79754		Guiding structures
2224/7932		Material of the auxiliary member	2224/79755		in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79343		by ultrasonic vibrations	2224/79756		in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79344		Eccentric cams	2224/798		Means for moving parts
2224/79345		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79801		Lower part of the bonding apparatus, e.g. XY table
2224/79346		in the upper part of the bonding apparatus, e.g. in the pressing head	2224/79802		Rotational mechanism
2224/79347		Piezoelectric transducers	2224/79803		Pivoting mechanism
2224/79348		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79804		Translational mechanism
2224/79349		in the upper part of the bonding apparatus, e.g. in the pressing head	2224/79821		Upper part of the bonding apparatus, i.e. pressing head
2224/7935		Stable and mobile yokes	2224/79822		Rotational mechanism
2224/79351		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79823		Pivoting mechanism
2224/79352		in the upper part of the bonding apparatus, e.g. in the pressing head	2224/79824		Translational mechanism
2224/79353		Ultrasonic horns	2224/79841		of the pressing head
2224/79354		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79842		Rotational mechanism
2224/79355		Design, e.g. of the wave guide	2224/79843		Pivoting mechanism
2224/795		Cooling means	2224/799		Means for monitoring the connection process
2224/79501		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79901		using a computer, e.g. fully- or semi-automatic bonding
2224/79502		in the upper part of the bonding apparatus, e.g. in the pressing head	2224/7992		Load or pressure adjusting means, e.g. sensors
2224/7955		Mechanical means, e.g. for pressing, stamping	2224/79925		Vibration adjusting means, e.g. sensors
2224/796		Means for supplying the connector to be connected in the bonding apparatus	2224/7995		Means for forming additional members
2224/79601		Storing means	2224/7998		specially adapted for batch processes
2224/79611		Feeding means	2224/79981		Apparatus chuck
2224/79621		Holding means	2224/79982		Shape
2224/7965		Means for transporting the components to be connected	2224/79983		of the mounting surface
2224/79651		Belt conveyor	2224/79984		of other portions
2224/79652		Chain conveyor	2224/79985		Material
2224/79653		Vibrating conveyor	2224/79986		Auxiliary members on the pressing surface
2224/79654		Pneumatic conveyor	2224/79987		Shape of the auxiliary member
2224/79655		in a fluid	2224/79988		Material of the auxiliary member
2224/797		Means for aligning	2224/7999		for disconnecting
2224/79701		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/80		Methods for connecting semiconductor or other solid state bodies using means for bonding being attached to, or being formed on, the surface to be connected
2224/79702		in the upper part of the bonding apparatus, e.g. in the pressing head	2224/80001		by connecting a bonding area directly to another bonding area, i.e. connectorless bonding, e.g. bumpless bonding
2224/79703		Mechanical holding means	2224/80003		involving a temporary auxiliary member not forming part of the bonding apparatus
2224/79704		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/80004		being a removable or sacrificial coating
2224/79705		in the upper part of the bonding apparatus, e.g. in the pressing head	2224/80006		being a temporary or sacrificial substrate
2224/79723		Electrostatic holding means	2224/80007		involving a permanent auxiliary member being left in the finished device, e.g. aids for protecting the bonding area during or after the bonding process
2224/79724		in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/80009		Pre-treatment of the bonding area
2224/79725		in the upper part of the bonding apparatus, e.g. in the pressing head			

2224/8001		Cleaning the bonding area, e.g. oxide removal step, desmearing	2224/80132		using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/80011		Chemical cleaning, e.g. etching, flux	2224/80136		involving guiding structures, e.g. spacers or supporting members
2224/80012		Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow	2224/80138		the guiding structures being at least partially left in the finished device
2224/80013		Plasma cleaning	2224/80139		Guiding structures on the body
2224/80014		Thermal cleaning, e.g. decomposition, sublimation	2224/8014		Guiding structures outside the body
2224/80019		Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8001 - H01L 2224/80014	2224/80141		Guiding structures both on and outside the body
2224/8002		Applying permanent coating to the bonding area in the bonding apparatus, e.g. in-situ coating	2224/80143		Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/80024		Applying flux to the bonding area in the bonding apparatus	2224/80148		involving movement of a part of the bonding apparatus
2224/8003		Reshaping the bonding area in the bonding apparatus, e.g. flattening the bonding area	2224/80149		being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/80031		by chemical means, e.g. etching, anodisation	2224/8015		Rotational movements
2224/80035		by heating means	2224/8016		Translational movements
2224/80037		using a polychromatic heating lamp	2224/80169		being the upper part of the bonding apparatus, i.e. bonding head
2224/80039		using a laser	2224/8017		Rotational movements
2224/80041		Induction heating, i.e. eddy currents	2224/8018		Translational movements
2224/80047		by mechanical means, e.g. severing, pressing, stamping	2224/8019		Arrangement of the bonding areas prior to mounting
2224/80048		Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling	2224/80194		Lateral distribution of the bonding areas
2224/80051		Forming additional members	2224/802		Applying energy for connecting
2224/80052		Detaching bonding areas, e.g. after testing	2224/80201		Compression bonding
2224/80053		Bonding environment	2224/80203		Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding
2224/80054		Composition of the atmosphere	2224/80204		with a graded temperature profile
2224/80055		being oxidating	2224/80205		Ultrasonic bonding
2224/80065		being reducing	2224/80206		Direction of oscillation
2224/80075		being inert	2224/80207		Thermosonic bonding
2224/80085		being a liquid, e.g. for fluidic self-assembly	2224/80209		applying unidirectional static pressure
2224/8009		Vacuum	2224/80211		applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid
2224/80091		Under pressure	2224/80213		using a reflow oven
2224/80092		Atmospheric pressure	2224/80215		with a graded temperature profile
2224/80093		Transient conditions, e.g. gas-flow	2224/8022		with energy being in the form of electromagnetic radiation
2224/80095		Temperature settings	2224/80222		Induction heating, i.e. eddy currents
2224/80096		Transient conditions	2224/80224		using a laser
2224/80097		Heating	2224/8023		Polychromatic or infrared lamp heating
2224/80098		Cooling	2224/80232		using an autocatalytic reaction, e.g. exothermic brazing
2224/80099		Ambient temperature	2224/80234		using means for applying energy being within the device, e.g. integrated heater
2224/8011		involving protection against electrical discharge, e.g. removing electrostatic charge	2224/80236		using electro-static corona discharge
2224/8012		Aligning	2224/80237		using an electron beam
2224/80121		Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors	2224/80238		using electric resistance welding, i.e. ohmic heating
2224/80122		by detecting inherent features of, or outside, the semiconductor or solid-state body	2224/8034		Bonding interfaces of the bonding area
2224/80123		Shape or position of the body	2224/80345		Shape, e.g. interlocking features
2224/80125		Bonding areas on the body	2224/80355		having an external coating, e.g. protective bond-through coating
2224/80127		Bonding areas outside the body	2224/80357		being flush with the surface
2224/80129		Shape or position of the other item	2224/80359		Material
2224/8013		using marks formed on the semiconductor or solid-state body			

2224/8036	. . . Bonding interfaces of the semiconductor or solid state body	2224/8048	 Molybdenum [Mo] as principal constituent
2224/80365	 Shape, e.g. interlocking features	2224/80481	 Tantalum [Ta] as principal constituent
2224/80375	 having an external coating, e.g. protective bond-through coating	2224/80483	 Rhenium [Re] as principal constituent
2224/80379	 Material	2224/80484	 Tungsten [W] as principal constituent
2224/8038	. . . Bonding interfaces outside the semiconductor or solid-state body	2224/80486	 with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/80385	 Shape, e.g. interlocking features	2224/80487	 Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/80395	 having an external coating, e.g. protective bond-through coating	2224/80488	 Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/80399	 Material	2224/8049	 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/804	 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/80491	 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/80401	 the principal constituent melting at a temperature of less than 400°C	2224/80493	 with a principal constituent of the material being a solid not provided for in groups H01L 2224/804 - H01L 2224/80491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80405	 Gallium [Ga] as principal constituent	2224/80494	 with a principal constituent of the material being a liquid not provided for in groups H01L 2224/804 - H01L 2224/80491
2224/80409	 Indium [In] as principal constituent	2224/80495	 with a principal constituent of the material being a gas not provided for in groups H01L 2224/804 - H01L 2224/80491
2224/80411	 Tin [Sn] as principal constituent	2224/80498	 with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80413	 Bismuth [Bi] as principal constituent	2224/80499	 Material of the matrix
2224/80414	 Thallium [Tl] as principal constituent	2224/805	 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80416	 Lead [Pb] as principal constituent	2224/80501	 the principal constituent melting at a temperature of less than 400°C
2224/80417	 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/80505	 Gallium [Ga] as principal constituent
2224/80418	 Zinc [Zn] as principal constituent	2224/80509	 Indium [In] as principal constituent
2224/8042	 Antimony [Sb] as principal constituent	2224/80511	 Tin [Sn] as principal constituent
2224/80423	 Magnesium [Mg] as principal constituent	2224/80513	 Bismuth [Bi] as principal constituent
2224/80424	 Aluminium [Al] as principal constituent	2224/80514	 Thallium [Tl] as principal constituent
2224/80438	 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/80516	 Lead [Pb] as principal constituent
2224/80439	 Silver [Ag] as principal constituent	2224/80517	 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80444	 Gold [Au] as principal constituent	2224/80518	 Zinc [Zn] as principal constituent
2224/80447	 Copper [Cu] as principal constituent	2224/8052	 Antimony [Sb] as principal constituent
2224/80449	 Manganese [Mn] as principal constituent	2224/80523	 Magnesium [Mg] as principal constituent
2224/80455	 Nickel [Ni] as principal constituent	2224/80524	 Aluminium [Al] as principal constituent
2224/80457	 Cobalt [Co] as principal constituent		
2224/8046	 Iron [Fe] as principal constituent		
2224/80463	 the principal constituent melting at a temperature of greater than 1550°C		
2224/80464	 Palladium [Pd] as principal constituent		
2224/80466	 Titanium [Ti] as principal constituent		
2224/80469	 Platinum [Pt] as principal constituent		
2224/8047	 Zirconium [Zr] as principal constituent		
2224/80471	 Chromium [Cr] as principal constituent		
2224/80472	 Vanadium [V] as principal constituent		
2224/80473	 Rhodium [Rh] as principal constituent		
2224/80476	 Ruthenium [Ru] as principal constituent		
2224/80478	 Iridium [Ir] as principal constituent		
2224/80479	 Niobium [Nb] as principal constituent		

2224/80538	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/80593	with a principal constituent of the material being a solid not provided for in groups H01L 2224/805 - H01L 2224/80591 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80539	Silver [Ag] as principal constituent	2224/80594	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/805 - H01L 2224/80591
2224/80544	Gold [Au] as principal constituent	2224/80595	with a principal constituent of the material being a gas not provided for in groups H01L 2224/805 - H01L 2224/80591
2224/80547	Copper [Cu] as principal constituent	2224/80598	Fillers
2224/80549	Manganese [Mn] as principal constituent	2224/80599	Base material
2224/80555	Nickel [Ni] as principal constituent	2224/806	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80557	Cobalt [Co] as principal constituent	2224/80601	the principal constituent melting at a temperature of less than 400°C
2224/8056	Iron [Fe] as principal constituent	2224/80605	Gallium [Ga] as principal constituent
2224/80563	the principal constituent melting at a temperature of greater than 1550°C	2224/80609	Indium [In] as principal constituent
2224/80564	Palladium [Pd] as principal constituent	2224/80611	Tin [Sn] as principal constituent
2224/80566	Titanium [Ti] as principal constituent	2224/80613	Bismuth [Bi] as principal constituent
2224/80569	Platinum [Pt] as principal constituent	2224/80614	Thallium [Tl] as principal constituent
2224/8057	Zirconium [Zr] as principal constituent	2224/80616	Lead [Pb] as principal constituent
2224/80571	Chromium [Cr] as principal constituent	2224/80617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80572	Vanadium [V] as principal constituent	2224/80618	Zinc [Zn] as principal constituent
2224/80573	Rhodium [Rh] as principal constituent	2224/8062	Antimony [Sb] as principal constituent
2224/80576	Ruthenium [Ru] as principal constituent	2224/80623	Magnesium [Mg] as principal constituent
2224/80578	Iridium [Ir] as principal constituent	2224/80624	Aluminium [Al] as principal constituent
2224/80579	Niobium [Nb] as principal constituent	2224/80638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/8058	Molybdenum [Mo] as principal constituent	2224/80639	Silver [Ag] as principal constituent
2224/80581	Tantalum [Ta] as principal constituent	2224/80644	Gold [Au] as principal constituent
2224/80583	Rhenium [Re] as principal constituent	2224/80647	Copper [Cu] as principal constituent
2224/80584	Tungsten [W] as principal constituent	2224/80649	Manganese [Mn] as principal constituent
2224/80586	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/80655	Nickel [Ni] as principal constituent
2224/80587	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/80657	Cobalt [Co] as principal constituent
2224/80588	Glasses, e.g. amorphous oxides, nitrides or fluorides		
2224/8059	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		
2224/80591	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		

2224/8066	Iron [Fe] as principal constituent	2224/80698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80663	the principal constituent melting at a temperature of greater than 1550°C	2224/80699	Coating material
2224/80664	Palladium [Pd] as principal constituent	2224/807	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80666	Titanium [Ti] as principal constituent	2224/80701	the principal constituent melting at a temperature of less than 400°C
2224/80669	Platinum [Pt] as principal constituent	2224/80705	Gallium [Ga] as principal constituent
2224/8067	Zirconium [Zr] as principal constituent	2224/80709	Indium [In] as principal constituent
2224/80671	Chromium [Cr] as principal constituent	2224/80711	Tin [Sn] as principal constituent
2224/80672	Vanadium [V] as principal constituent	2224/80713	Bismuth [Bi] as principal constituent
2224/80673	Rhodium [Rh] as principal constituent	2224/80714	Thallium [Tl] as principal constituent
2224/80676	Ruthenium [Ru] as principal constituent	2224/80716	Lead [Pb] as principal constituent
2224/80678	Iridium [Ir] as principal constituent	2224/80717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80679	Niobium [Nb] as principal constituent	2224/80718	Zinc [Zn] as principal constituent
2224/8068	Molybdenum [Mo] as principal constituent	2224/8072	Antimony [Sb] as principal constituent
2224/80681	Tantalum [Ta] as principal constituent	2224/80723	Magnesium [Mg] as principal constituent
2224/80683	Rhenium [Re] as principal constituent	2224/80724	Aluminium [Al] as principal constituent
2224/80684	Tungsten [W] as principal constituent	2224/80738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/80686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/80739	Silver [Ag] as principal constituent
2224/80687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/80744	Gold [Au] as principal constituent
2224/80688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/80747	Copper [Cu] as principal constituent
2224/8069	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/80749	Manganese [Mn] as principal constituent
2224/80691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/80755	Nickel [Ni] as principal constituent
2224/80693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/806 - H01L 2224/80691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/80757	Cobalt [Co] as principal constituent
2224/80694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/806 - H01L 2224/80691	2224/8076	Iron [Fe] as principal constituent
2224/80695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/806 - H01L 2224/80691	2224/80763	the principal constituent melting at a temperature of greater than 1550°C
		2224/80764	Palladium [Pd] as principal constituent
		2224/80766	Titanium [Ti] as principal constituent

2224/80769	Platinum [Pt] as principal constituent	2224/8081	involving forming an intermetallic compound at the bonding interface
2224/8077	Zirconium [Zr] as principal constituent	2224/80815	Reflow soldering
2224/80771	Chromium [Cr] as principal constituent	2224/8082	Diffusion bonding
2224/80772	Vanadium [V] as principal constituent	2224/80825	Solid-liquid interdiffusion
2224/80773	Rhodium [Rh] as principal constituent	2224/8083	Solid-solid interdiffusion
2224/80776	Ruthenium [Ru] as principal constituent	2224/8084	Sintering
2224/80778	Iridium [Ir] as principal constituent	2224/8085	using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/80779	Niobium [Nb] as principal constituent	2224/80855	Hardening the adhesive by curing, i.e. thermosetting
2224/8078	Molybdenum [Mo] as principal constituent	2224/80856	Pre-cured adhesive, i.e. B-stage adhesive
2224/80781	Tantalum [Ta] as principal constituent	2224/80859	Localised curing of parts of the bonding area
2224/80783	Rhenium [Re] as principal constituent	2224/80862	Heat curing
2224/80784	Tungsten [W] as principal constituent	2224/80865	Microwave curing
2224/80786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/80868	Infrared [IR] curing
2224/80787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/80871	Visible light curing
2224/80788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/80874	Ultraviolet [UV] curing
2224/8079	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/80877	Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/80791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/8088	Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/80793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/807 - H01L 2224/80791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/80885	Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/80855 - H01L 2224/8088 , e.g. for hybrid thermoplastic-thermosetting adhesives
2224/80794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/807 - H01L 2224/80791	2224/8089	using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/80795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/807 - H01L 2224/80791	2224/80893	Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/80798	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/80894	Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/80799	Shape or distribution of the fillers	2224/80895	between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/808	Bonding techniques	2224/80896	between electrically insulating surfaces, e.g. oxide or nitride layers
2224/80801	Soldering or alloying	2224/80897	Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
2224/80805	involving forming a eutectic alloy at the bonding interface	2224/80898	Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
		2224/80899	using resilient parts in the bonding area
		2224/809	with the bonding area not providing any mechanical bonding
		2224/80901	Pressing a bonding area against another bonding area by means of a further bonding area or connector
		2224/80902	by means of a further bonding area
		2224/80903	by means of a bump or layer connector
		2224/80904	by means of an encapsulation layer or foil
		2224/80905	Combinations of bonding methods provided for in at least two different groups from H01L 2224/808 - H01L 2224/80904

- 2224/80906 Specific sequence of method steps
- 2224/80907 Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
- 2224/80908 involving monitoring, e.g. feedback loop
- 2224/80909 Post-treatment of the bonding area
- 2224/8091 Cleaning, e.g. oxide removal step, desmearing
- 2224/80911 Chemical cleaning, e.g. etching, flux
- 2224/80912 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/80913 Plasma cleaning
- 2224/80914 Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/80919 Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8091](#) - [H01L 2224/80914](#)
- 2224/8092 Applying permanent coating, e.g. protective coating
- 2224/8093 Reshaping
- 2224/80931 by chemical means, e.g. etching
- 2224/80935 by heating means, e.g. reflowing
- 2224/80937 using a polychromatic heating lamp
- 2224/80939 using a laser
- 2224/80941 Induction heating, i.e. eddy currents
- 2224/80943 using a flame torch, e.g. hydrogen torch
- 2224/80945 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/80947 by mechanical means, e.g. pull-and-cut, pressing, stamping
- 2224/80948 Thermal treatments, e.g. annealing, controlled cooling
- 2224/80951 Forming additional members, e.g. for reinforcing
- 2224/80986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/81 using a bump connector
- 2224/81001 involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/81002 being a removable or sacrificial coating
- 2224/81005 being a temporary or sacrificial substrate
- 2224/81007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the bump connector during or after the bonding process
- 2224/81009 Pre-treatment of the bump connector or the bonding area
- 2224/8101 Cleaning the bump connector, e.g. oxide removal step, desmearing
- 2224/81011 Chemical cleaning, e.g. etching, flux
- 2224/81012 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/81013 Plasma cleaning
- 2224/81014 Thermal cleaning, e.g. decomposition, sublimation
- 2224/81019 Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8101](#) - [H01L 2224/81014](#)
- 2224/8102 Applying permanent coating to the bump connector in the bonding apparatus, e.g. in-situ coating
- 2224/81022 Cleaning the bonding area, e.g. oxide removal step, desmearing
- 2224/81024 Applying flux to the bonding area
- 2224/81026 Applying a precursor material to the bonding area
- 2224/8103 Reshaping the bump connector in the bonding apparatus, e.g. flattening the bump connector
- 2224/81031 by chemical means, e.g. etching, anodisation
- 2224/81035 by heating means
- 2224/81037 using a polychromatic heating lamp
- 2224/81039 using a laser
- 2224/81041 Induction heating, i.e. eddy currents
- 2224/81047 by mechanical means, e.g. severing, pressing, stamping
- 2224/81048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/81051 Forming additional members
- 2224/81052 Detaching bump connectors, e.g. after testing
- 2224/81053 Bonding environment
- 2224/81054 Composition of the atmosphere
- 2224/81055 being oxidating
- 2224/81065 being reducing
- 2224/81075 being inert
- 2224/81085 being a liquid, e.g. for fluidic self-assembly
- 2224/8109 Vacuum
- 2224/81091 Under pressure
- 2224/81092 Atmospheric pressure
- 2224/81093 Transient conditions, e.g. gas-flow
- 2224/81095 Temperature settings
- 2224/81096 Transient conditions
- 2224/81097 Heating
- 2224/81098 Cooling
- 2224/81099 Ambient temperature
- 2224/811 the bump connector being supplied to the parts to be connected in the bonding apparatus
- 2224/81101 as prepreg comprising a bump connector, e.g. provided in an insulating plate member
- 2224/8111 involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8112 Aligning
- 2224/81121 Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/81122 by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/81123 Shape or position of the body
- 2224/81125 Bonding areas on the body
- 2224/81127 Bonding areas outside the body
- 2224/81129 Shape or position of the other item
- 2224/8113 using marks formed on the semiconductor or solid-state body
- 2224/81132 using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/81136 involving guiding structures, e.g. spacers or supporting members
- 2224/81138 the guiding structures being at least partially left in the finished device

2224/81139		Guiding structures on the body	2224/81355		having an external coating, e.g. protective bond-through coating
2224/8114		Guiding structures outside the body	2224/81359		Material
2224/81141		Guiding structures both on and outside the body	2224/8136		Bonding interfaces of the semiconductor or solid state body
2224/81143		Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium	2224/81365		Shape, e.g. interlocking features
2224/81148		involving movement of a part of the bonding apparatus	2224/81375		having an external coating, e.g. protective bond-through coating
2224/81149		being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table	2224/81379		Material
2224/8115		Rotational movements	2224/8138		Bonding interfaces outside the semiconductor or solid-state body
2224/8116		Translational movements	2224/81385		Shape, e.g. interlocking features
2224/81169		being the upper part of the bonding apparatus, i.e. bonding head	2224/81395		having an external coating, e.g. protective bond-through coating
2224/8117		Rotational movements	2224/81399		Material
2224/8118		Translational movements	2224/814		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/8119		Arrangement of the bump connectors prior to mounting	2224/81401		the principal constituent melting at a temperature of less than 400°C
2224/81191		wherein the bump connectors are disposed only on the semiconductor or solid-state body	2224/81405		Gallium [Ga] as principal constituent
2224/81192		wherein the bump connectors are disposed only on another item or body to be connected to the semiconductor or solid-state body	2224/81409		Indium [In] as principal constituent
2224/81193		wherein the bump connectors are disposed on both the semiconductor or solid-state body and another item or body to be connected to the semiconductor or solid-state body	2224/81411		Tin [Sn] as principal constituent
2224/81194		Lateral distribution of the bump connectors	2224/81413		Bismuth [Bi] as principal constituent
2224/812		Applying energy for connecting	2224/81414		Thallium [Tl] as principal constituent
2224/81201		Compression bonding	2224/81416		Lead [Pb] as principal constituent
2224/81203		Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding	2224/81417		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/81204		with a graded temperature profile	2224/81418		Zinc [Zn] as principal constituent
2224/81205		Ultrasonic bonding	2224/8142		Antimony [Sb] as principal constituent
2224/81206		Direction of oscillation	2224/81423		Magnesium [Mg] as principal constituent
2224/81207		Thermosonic bonding	2224/81424		Aluminium [Al] as principal constituent
2224/81208		applying unidirectional static pressure	2224/81438		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/81209		applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid	2224/81439		Silver [Ag] as principal constituent
2224/8121		using a reflow oven	2224/81444		Gold [Au] as principal constituent
2224/81211		with a graded temperature profile	2224/81447		Copper [Cu] as principal constituent
2224/8122		with energy being in the form of electromagnetic radiation	2224/81449		Manganese [Mn] as principal constituent
2224/81222		Induction heating, i.e. eddy currents	2224/81455		Nickel [Ni] as principal constituent
2224/81224		using a laser	2224/81457		Cobalt [Co] as principal constituent
2224/8123		Polychromatic or infrared lamp heating	2224/8146		Iron [Fe] as principal constituent
2224/81232		using an autocatalytic reaction, e.g. exothermic brazing	2224/81463		the principal constituent melting at a temperature of greater than 1550°C
2224/81234		using means for applying energy being within the device, e.g. integrated heater	2224/81464		Palladium [Pd] as principal constituent
2224/81236		using electro-static corona discharge	2224/81466		Titanium [Ti] as principal constituent
2224/81237		using an electron beam	2224/81469		Platinum [Pt] as principal constituent
2224/81238		using electric resistance welding, i.e. ohmic heating	2224/8147		Zirconium [Zr] as principal constituent
2224/8134		Bonding interfaces of the bump connector	2224/81471		Chromium [Cr] as principal constituent
2224/81345		Shape, e.g. interlocking features	2224/81472		Vanadium [V] as principal constituent
			2224/81473		Rhodium [Rh] as principal constituent
			2224/81476		Ruthenium [Ru] as principal constituent

2224/81478		Iridium [Ir] as principal constituent	2224/81524		Aluminium [Al] as principal constituent
2224/81479		Niobium [Nb] as principal constituent	2224/81538		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/8148		Molybdenum [Mo] as principal constituent	2224/81539		Silver [Ag] as principal constituent
2224/81481		Tantalum [Ta] as principal constituent	2224/81544		Gold [Au] as principal constituent
2224/81483		Rhenium [Re] as principal constituent	2224/81547		Copper [Cu] as principal constituent
2224/81484		Tungsten [W] as principal constituent	2224/81549		Manganese [Mn] as principal constituent
2224/81486		with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/81555		Nickel [Ni] as principal constituent
2224/81487		Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/81557		Cobalt [Co] as principal constituent
2224/81488		Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/8156		Iron [Fe] as principal constituent
2224/8149		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/81563		the principal constituent melting at a temperature of greater than 1550°C
2224/81491		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/81564		Palladium [Pd] as principal constituent
2224/81493		with a principal constituent of the material being a solid not provided for in groups H01L 2224/814 - H01L 2224/81491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/81566		Titanium [Ti] as principal constituent
2224/81494		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/814 - H01L 2224/81491	2224/81569		Platinum [Pt] as principal constituent
2224/81495		with a principal constituent of the material being a gas not provided for in groups H01L 2224/814 - H01L 2224/81491	2224/8157		Zirconium [Zr] as principal constituent
2224/81498		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/81571		Chromium [Cr] as principal constituent
2224/81499		Material of the matrix	2224/81572		Vanadium [V] as principal constituent
2224/815		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/81573		Rhodium [Rh] as principal constituent
2224/81501		the principal constituent melting at a temperature of less than 400°C	2224/81576		Ruthenium [Ru] as principal constituent
2224/81505		Gallium [Ga] as principal constituent	2224/81578		Iridium [Ir] as principal constituent
2224/81509		Indium [In] as principal constituent	2224/81579		Niobium [Nb] as principal constituent
2224/81511		Tin [Sn] as principal constituent	2224/8158		Molybdenum [Mo] as principal constituent
2224/81513		Bismuth [Bi] as principal constituent	2224/81581		Tantalum [Ta] as principal constituent
2224/81514		Thallium [Tl] as principal constituent	2224/81583		Rhenium [Re] as principal constituent
2224/81516		Lead [Pb] as principal constituent	2224/81584		Tungsten [W] as principal constituent
2224/81517		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/81586		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81518		Zinc [Zn] as principal constituent	2224/81587		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/8152		Antimony [Sb] as principal constituent	2224/81588		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/81523		Magnesium [Mg] as principal constituent	2224/8159		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
			2224/81591		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/81593	with a principal constituent of the material being a solid not provided for in groups H01L 2224/815 - H01L 2224/81591 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/8166	Iron [Fe] as principal constituent
2224/81594	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/815 - H01L 2224/81591	2224/81663	the principal constituent melting at a temperature of greater than 1550°C
2224/81595	with a principal constituent of the material being a gas not provided for in groups H01L 2224/815 - H01L 2224/81591	2224/81664	Palladium [Pd] as principal constituent
2224/81598	Fillers	2224/81666	Titanium [Ti] as principal constituent
2224/81599	Base material	2224/81669	Platinum [Pt] as principal constituent
2224/816	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/8167	Zirconium [Zr] as principal constituent
2224/81601	the principal constituent melting at a temperature of less than 400°C	2224/81671	Chromium [Cr] as principal constituent
2224/81605	Gallium [Ga] as principal constituent	2224/81672	Vanadium [V] as principal constituent
2224/81609	Indium [In] as principal constituent	2224/81673	Rhodium [Rh] as principal constituent
2224/81611	Tin [Sn] as principal constituent	2224/81676	Ruthenium [Ru] as principal constituent
2224/81613	Bismuth [Bi] as principal constituent	2224/81678	Iridium [Ir] as principal constituent
2224/81614	Thallium [Tl] as principal constituent	2224/81679	Niobium [Nb] as principal constituent
2224/81616	Lead [Pb] as principal constituent	2224/8168	Molybdenum [Mo] as principal constituent
2224/81617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/81681	Tantalum [Ta] as principal constituent
2224/81618	Zinc [Zn] as principal constituent	2224/81683	Rhenium [Re] as principal constituent
2224/8162	Antimony [Sb] as principal constituent	2224/81684	Tungsten [W] as principal constituent
2224/81623	Magnesium [Mg] as principal constituent	2224/81686	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81624	Aluminium [Al] as principal constituent	2224/81687	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/81638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/81688	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/81639	Silver [Ag] as principal constituent	2224/8169	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/81644	Gold [Au] as principal constituent	2224/81691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81647	Copper [Cu] as principal constituent	2224/81693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/816 - H01L 2224/81691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81649	Manganese [Mn] as principal constituent	2224/81694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/816 - H01L 2224/81691
2224/81655	Nickel [Ni] as principal constituent	2224/81695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/816 - H01L 2224/81691
2224/81657	Cobalt [Co] as principal constituent		

2224/81698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/81769	Platinum [Pt] as principal constituent
2224/81699	Coating material	2224/8177	Zirconium [Zr] as principal constituent
2224/817	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/81771	Chromium [Cr] as principal constituent
2224/81701	the principal constituent melting at a temperature of less than 400°C	2224/81772	Vanadium [V] as principal constituent
2224/81705	Gallium [Ga] as principal constituent	2224/81773	Rhodium [Rh] as principal constituent
2224/81709	Indium [In] as principal constituent	2224/81776	Ruthenium [Ru] as principal constituent
2224/81711	Tin [Sn] as principal constituent	2224/81778	Iridium [Ir] as principal constituent
2224/81713	Bismuth [Bi] as principal constituent	2224/81779	Niobium [Nb] as principal constituent
2224/81714	Thallium [Tl] as principal constituent	2224/8178	Molybdenum [Mo] as principal constituent
2224/81716	Lead [Pb] as principal constituent	2224/81781	Tantalum [Ta] as principal constituent
2224/81717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/81783	Rhenium [Re] as principal constituent
2224/81718	Zinc [Zn] as principal constituent	2224/81784	Tungsten [W] as principal constituent
2224/8172	Antimony [Sb] as principal constituent	2224/81786	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81723	Magnesium [Mg] as principal constituent	2224/81787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/81724	Aluminium [Al] as principal constituent	2224/81788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/81738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/8179	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/81739	Silver [Ag] as principal constituent	2224/81791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81744	Gold [Au] as principal constituent	2224/81793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/817 - H01L 2224/81791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81747	Copper [Cu] as principal constituent	2224/81794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/817 - H01L 2224/81791
2224/81749	Manganese [Mn] as principal constituent	2224/81795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/817 - H01L 2224/81791
2224/81755	Nickel [Ni] as principal constituent	2224/81798	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/81757	Cobalt [Co] as principal constituent	2224/81799	Shape or distribution of the fillers
2224/8176	Iron [Fe] as principal constituent	2224/818	Bonding techniques
2224/81763	the principal constituent melting at a temperature of greater than 1550°C	2224/81801	Soldering or alloying
2224/81764	Palladium [Pd] as principal constituent	2224/81805	involving forming a eutectic alloy at the bonding interface
2224/81766	Titanium [Ti] as principal constituent		

- 2224/8181 involving forming an intermetallic compound at the bonding interface
- 2224/81815 Reflow soldering
- 2224/8182 Diffusion bonding
- 2224/81825 Solid-liquid interdiffusion
- 2224/8183 Solid-solid interdiffusion
- 2224/8184 Sintering
- 2224/8185 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/81855 Hardening the adhesive by curing, i.e. thermosetting
- 2224/81856 Pre-cured adhesive, i.e. B-stage adhesive
- 2224/81859 Localised curing of parts of the bump connector
- 2224/81862 Heat curing
- 2224/81865 Microwave curing
- 2224/81868 Infrared [IR] curing
- 2224/81871 Visible light curing
- 2224/81874 Ultraviolet [UV] curing
- 2224/81877 Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8188 Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
- 2224/81885 Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/81855](#) - [H01L 2224/8188](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/8189 using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/81893 Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/81894 Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/81895 between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/81896 between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/81897 Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
- 2224/81898 Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
- 2224/81899 using resilient parts in the bump connector or in the bonding area
- 2224/819 with the bump connector not providing any mechanical bonding
- 2224/81901 Pressing the bump connector against the bonding areas by means of another connector
- 2224/81902 by means of another bump connector
- 2224/81903 by means of a layer connector
- 2224/81904 by means of an encapsulation layer or foil
- 2224/81905 Combinations of bonding methods provided for in at least two different groups from [H01L 2224/818](#) - [H01L 2224/81904](#)
- 2224/81906 Specific sequence of method steps
- 2224/81907 Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
- 2224/81908 involving monitoring, e.g. feedback loop
- 2224/81909 Post-treatment of the bump connector or bonding area
- 2224/8191 Cleaning, e.g. oxide removal step, desmearing
- 2224/81911 Chemical cleaning, e.g. etching, flux
- 2224/81912 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/81913 Plasma cleaning
- 2224/81914 Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/81919 Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8191](#) - [H01L 2224/81914](#)
- 2224/8192 Applying permanent coating, e.g. protective coating
- 2224/8193 Reshaping
- 2224/81931 by chemical means, e.g. etching
- 2224/81935 by heating means, e.g. reflowing
- 2224/81937 using a polychromatic heating lamp
- 2224/81939 using a laser
- 2224/81941 Induction heating, i.e. eddy currents
- 2224/81943 using a flame torch, e.g. hydrogen torch
- 2224/81945 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/81947 by mechanical means, e.g. "pull-and-cut", pressing, stamping
- 2224/81948 Thermal treatments, e.g. annealing, controlled cooling
- 2224/81951 Forming additional members, e.g. for reinforcing
- 2224/81986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/82 by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI]
- 2224/82001 involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/82002 being a removable or sacrificial coating
- 2224/82005 being a temporary or sacrificial substrate
- 2224/82007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting a build-up interconnect during or after the bonding process
- 2224/82009 Pre-treatment of the connector or the bonding area
- 2224/8201 Cleaning, e.g. oxide removal step, desmearing
- 2224/8203 Reshaping, e.g. forming vias
- 2224/82031 by chemical means, e.g. etching, anodisation
- 2224/82035 by heating means
- 2224/82039 using a laser
- 2224/82045 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/82047 by mechanical means, e.g. severing, pressing, stamping

2224/82048	 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling	2224/82207	 Thermosonic bonding
2224/82051	 Forming additional members	2224/8221	 with energy being in the form of electromagnetic radiation
2224/82053	. . . Bonding environment	2224/82212	 Induction heating, i.e. eddy currents
2224/82054	 Composition of the atmosphere	2224/82214	 using a laser
2224/82085	 being a liquid, e.g. for fluidic self-assembly	2224/8223	 Polychromatic or infrared lamp heating
2224/8209	 Vacuum	2224/82232	 using an autocatalytic reaction, e.g. exothermic brazing
2224/82091	 Under pressure	2224/82234	 using means for applying energy being within the device, e.g. integrated heater
2224/82095	 Temperature settings	2224/82236	 using electro-static corona discharge
2224/82096	 Transient conditions	2224/82237	 using electron beam
2224/82097	 Heating	2224/82238	 using electric resistance welding, i.e. ohmic heating
2224/82098	 Cooling	2224/8234	. . . Bonding interfaces of the connector
2224/82099	 Ambient temperature	2224/82345	 Shape, e.g. interlocking features
2224/821	. . . Forming a build-up interconnect	2224/82355	 having an external coating, e.g. protective bond-through coating
2224/82101	 by additive methods, e.g. direct writing	2224/82359	 Material
2224/82102	 using jetting, e.g. ink jet	2224/8236	. . . Bonding interfaces of the semiconductor or solid state body
2224/82103	 using laser direct writing	2224/82365	 Shape, e.g. interlocking features
2224/82104	 using screen printing	2224/82375	 having an external coating, e.g. protective bond-through coating
2224/82105	 by using a preform	2224/82379	 Material
2224/82106	 by subtractive methods	2224/8238	. . . Bonding interfaces outside the semiconductor or solid-state body
2224/82108	 by self-assembly processes	2224/82385	 Shape, e.g. interlocking features
2224/8211	. . . involving protection against electrical discharge, e.g. removing electrostatic charge	2224/82395	 having an external coating, e.g. protective bond-through coating
2224/8212	. . . Aligning	2224/82399	 Material
2224/82121	 Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors	2224/828	. . . Bonding techniques
2224/82122	 by detecting inherent features of, or outside, the semiconductor or solid-state body	2224/82801	 Soldering or alloying
2224/8213	 using marks formed on the semiconductor or solid-state body	2224/82805	 involving forming a eutectic alloy at the bonding interface
2224/82132	 using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"	2224/8281	 involving forming an intermetallic compound at the bonding interface
2224/82136	 involving guiding structures, e.g. spacers or supporting members	2224/82815	 Reflow soldering
2224/82138	 the guiding structures being at least partially left in the finished device	2224/8282	 Diffusion bonding
2224/82143	 Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium	2224/82825	 Solid-liquid interdiffusion
2224/82148	 involving movement of a part of the bonding apparatus	2224/8283	 Solid-solid interdiffusion
2224/82149	 being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table	2224/8284	 Sintering
2224/8215	 Rotational movements	2224/8285	 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/8216	 Translational movements	2224/82855	 Hardening the adhesive by curing, i.e. thermosetting
2224/82169	 being the upper part of the bonding apparatus, e.g. nozzle	2224/82856	 Pre-cured adhesive, i.e. B-stage adhesive
2224/8217	 Rotational movement	2224/82859	 Localised curing of parts of the connector
2224/8218	 Translational movements	2224/82862	 Heat curing
2224/82181	 connecting first on the semiconductor or solid-state body, i.e. on-chip,	2224/82865	 Microwave curing
2224/82186	 connecting first outside the semiconductor or solid-state body, i.e. off-chip	2224/82868	 Infrared [IR] curing
2224/82191	 connecting first both on and outside the semiconductor or solid-state body	2224/82871	 Visible light curing
2224/822	. . . Applying energy for connecting	2224/82874	 Ultraviolet [UV] curing
2224/82201	 Compression bonding	2224/82877	 Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/82203	 Thermocompression bonding	2224/8288	 Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/82205	 Ultrasonic bonding		

- 2224/82885 Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/82855](#) - [H01L 2224/8288](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/8289 using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/82893 Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/82895 Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/82896 between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/82897 between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/82899 Combinations of bonding methods provided for in at least two different groups from [H01L 2224/828](#) - [H01L 2224/82897](#)
- 2224/829 involving monitoring, e.g. feedback loop
- 2224/82909 Post-treatment of the connector or the bonding area
- 2224/8291 Cleaning, e.g. oxide removal step, desmearing
- 2224/8293 Reshaping
- 2224/82931 by chemical means, e.g. etching, anodisation
- 2224/82935 by heating means
- 2224/82939 using a laser
- 2224/82945 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/82947 by mechanical means, e.g. severing, pressing, stamping
- 2224/82948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/82951 Forming additional members
- 2224/82986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/83 using a layer connector
- 2224/83001 involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/83002 being a removable or sacrificial coating
- 2224/83005 being a temporary or sacrificial substrate
- 2224/83007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the layer connector during or after the bonding process
- 2224/83009 Pre-treatment of the layer connector or the bonding area
- 2224/8301 Cleaning the layer connector, e.g. oxide removal step, desmearing
- 2224/83011 Chemical cleaning, e.g. etching, flux
- 2224/83012 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/83013 Plasma cleaning
- 2224/83014 Thermal cleaning, e.g. decomposition, sublimation
- 2224/83019 Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8301](#) - [H01L 2224/83014](#)
- 2224/8302 Applying permanent coating to the layer connector in the bonding apparatus, e.g. in-situ coating
- 2224/83022 Cleaning the bonding area, e.g. oxide removal step, desmearing
- 2224/83024 Applying flux to the bonding area
- 2224/83026 Applying a precursor material to the bonding area
- 2224/8303 Reshaping the layer connector in the bonding apparatus, e.g. flattening the layer connector
- 2224/83031 by chemical means, e.g. etching, anodisation
- 2224/83035 by heating means
- 2224/83037 using a polychromatic heating lamp
- 2224/83039 using a laser
- 2224/83041 Induction heating, i.e. eddy currents
- 2224/83047 by mechanical means, e.g. severing, pressing, stamping
- 2224/83048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/83051 Forming additional members, e.g. dam structures
- 2224/83052 Detaching layer connectors, e.g. after testing
- 2224/83053 Bonding environment
- 2224/83054 Composition of the atmosphere
- 2224/83055 being oxidating
- 2224/83065 being reducing
- 2224/83075 being inert
- 2224/83085 being a liquid, e.g. for fluidic self-assembly
- 2224/8309 Vacuum
- 2224/83091 Under pressure
- 2224/83092 Atmospheric pressure
- 2224/83093 Transient conditions, e.g. gas-flow
- 2224/83095 Temperature settings
- 2224/83096 Transient conditions
- 2224/83097 Heating
- 2224/83098 Cooling
- 2224/83099 Ambient temperature
- 2224/831 the layer connector being supplied to the parts to be connected in the bonding apparatus
- 2224/83101 as prepeg comprising a layer connector, e.g. provided in an insulating plate member
- 2224/83102 using surface energy, e.g. capillary forces
- 2224/83104 by applying pressure, e.g. by injection
- 2224/8311 involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8312 Aligning
- 2224/83121 Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/83122 by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/83123 Shape or position of the body
- 2224/83125 Bonding areas on the body
- 2224/83127 Bonding areas outside the body
- 2224/83129 Shape or position of the other item
- 2224/8313 using marks formed on the semiconductor or solid-state body

2224/83132		using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"	2224/83237		using an electron beam
2224/83136		involving guiding structures, e.g. spacers or supporting members	2224/83238		using electric resistance welding, i.e. ohmic heating
2224/83138		the guiding structures being at least partially left in the finished device	2224/8334		Bonding interfaces of the layer connector
2224/83139		Guiding structures on the body	2224/83345		Shape, e.g. interlocking features
2224/8314		Guiding structures outside the body	2224/83355		having an external coating, e.g. protective bond-through coating
2224/83141		Guiding structures both on and outside the body	2224/83359		Material
2224/83143		Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium	2224/8336		Bonding interfaces of the semiconductor or solid state body
2224/83148		involving movement of a part of the bonding apparatus	2224/83365		Shape, e.g. interlocking features
2224/83149		being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table	2224/83375		having an external coating, e.g. protective bond-through coating
2224/8315		Rotational movements	2224/83379		Material
2224/8316		Translational movements	2224/8338		Bonding interfaces outside the semiconductor or solid-state body
2224/83169		being the upper part of the bonding apparatus, i.e. bonding head	2224/83385		Shape, e.g. interlocking features
2224/8317		Rotational movements	2224/83395		having an external coating, e.g. protective bond-through coating
2224/8318		Translational movements	2224/83399		Material
2224/8319		Arrangement of the layer connectors prior to mounting	2224/834		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/83191		wherein the layer connectors are disposed only on the semiconductor or solid-state body	2224/83401		the principal constituent melting at a temperature of less than 400°C
2224/83192		wherein the layer connectors are disposed only on another item or body to be connected to the semiconductor or solid-state body	2224/83405		Gallium [Ga] as principal constituent
2224/83193		wherein the layer connectors are disposed on both the semiconductor or solid-state body and another item or body to be connected to the semiconductor or solid-state body	2224/83409		Indium [In] as principal constituent
2224/83194		Lateral distribution of the layer connectors	2224/83411		Tin [Sn] as principal constituent
2224/832		Applying energy for connecting	2224/83413		Bismuth [Bi] as principal constituent
2224/83201		Compression bonding	2224/83414		Thallium [Tl] as principal constituent
2224/83203		Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding	2224/83416		Lead [Pb] as principal constituent
2224/83204		with a graded temperature profile	2224/83417		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/83205		Ultrasonic bonding	2224/83418		Zinc [Zn] as principal constituent
2224/83206		Direction of oscillation	2224/8342		Antimony [Sb] as principal constituent
2224/83207		Thermosonic bonding	2224/83423		Magnesium [Mg] as principal constituent
2224/83208		applying unidirectional static pressure	2224/83424		Aluminium [Al] as principal constituent
2224/83209		applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid	2224/83438		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/8321		using a reflow oven	2224/83439		Silver [Ag] as principal constituent
2224/83211		with a graded temperature profile	2224/83444		Gold [Au] as principal constituent
2224/8322		with energy being in the form of electromagnetic radiation	2224/83447		Copper [Cu] as principal constituent
2224/83222		Induction heating, i.e. eddy currents	2224/83449		Manganese [Mn] as principal constituent
2224/83224		using a laser	2224/83455		Nickel [Ni] as principal constituent
2224/8323		Polychromatic or infrared lamp heating	2224/83457		Cobalt [Co] as principal constituent
2224/83232		using an autocatalytic reaction, e.g. exothermic brazing	2224/8346		Iron [Fe] as principal constituent
2224/83234		using means for applying energy being within the device, e.g. integrated heater	2224/83463		the principal constituent melting at a temperature of greater than 1550°C
2224/83236		using electro-static corona discharge	2224/83464		Palladium [Pd] as principal constituent
			2224/83466		Titanium [Ti] as principal constituent
			2224/83469		Platinum [Pt] as principal constituent
			2224/8347		Zirconium [Zr] as principal constituent

2224/83471	Chromium [Cr] as principal constituent	2224/83518	Zinc [Zn] as principal constituent
2224/83472	Vanadium [V] as principal constituent	2224/8352	Antimony [Sb] as principal constituent
2224/83473	Rhodium [Rh] as principal constituent	2224/83523	Magnesium [Mg] as principal constituent
2224/83476	Ruthenium [Ru] as principal constituent	2224/83524	Aluminium [Al] as principal constituent
2224/83478	Iridium [Ir] as principal constituent	2224/83538	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/83479	Niobium [Nb] as principal constituent	2224/83539	Silver [Ag] as principal constituent
2224/8348	Molybdenum [Mo] as principal constituent	2224/83544	Gold [Au] as principal constituent
2224/83481	Tantalum [Ta] as principal constituent	2224/83547	Copper [Cu] as principal constituent
2224/83483	Rhenium [Re] as principal constituent	2224/83549	Manganese [Mn] as principal constituent
2224/83484	Tungsten [W] as principal constituent	2224/83555	Nickel [Ni] as principal constituent
2224/83486	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/83557	Cobalt [Co] as principal constituent
2224/83487	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/8356	Iron [Fe] as principal constituent
2224/83488	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/83563	the principal constituent melting at a temperature of greater than 1550°C
2224/8349	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/83564	Palladium [Pd] as principal constituent
2224/83491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/83566	Titanium [Ti] as principal constituent
2224/83493	with a principal constituent of the material being a solid not provided for in groups H01L 2224/834 - H01L 2224/83491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/83569	Platinum [Pt] as principal constituent
2224/83494	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/834 - H01L 2224/83491	2224/8357	Zirconium [Zr] as principal constituent
2224/83495	with a principal constituent of the material being a gas not provided for in groups H01L 2224/834 - H01L 2224/83491	2224/83571	Chromium [Cr] as principal constituent
2224/83498	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/83572	Vanadium [V] as principal constituent
2224/83499	Material of the matrix	2224/83573	Rhodium [Rh] as principal constituent
2224/835	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/83576	Ruthenium [Ru] as principal constituent
2224/83501	the principal constituent melting at a temperature of less than 400°C	2224/83578	Iridium [Ir] as principal constituent
2224/83505	Gallium [Ga] as principal constituent	2224/83579	Niobium [Nb] as principal constituent
2224/83509	Indium [In] as principal constituent	2224/8358	Molybdenum [Mo] as principal constituent
2224/83511	Tin [Sn] as principal constituent	2224/83581	Tantalum [Ta] as principal constituent
2224/83513	Bismuth [Bi] as principal constituent	2224/83583	Rhenium [Re] as principal constituent
2224/83514	Thallium [Tl] as principal constituent	2224/83584	Tungsten [W] as principal constituent
2224/83516	Lead [Pb] as principal constituent	2224/83586	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83517	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/83587	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/83588	Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/8359		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/83647		Copper [Cu] as principal constituent
2224/83591		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/83649		Manganese [Mn] as principal constituent
2224/83593		with a principal constituent of the material being a solid not provided for in groups H01L 2224/835 - H01L 2224/83591 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/83655		Nickel [Ni] as principal constituent
2224/83594		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/835 - H01L 2224/83591	2224/83657		Cobalt [Co] as principal constituent
2224/83595		with a principal constituent of the material being a gas not provided for in groups H01L 2224/835 - H01L 2224/83591	2224/8366		Iron [Fe] as principal constituent
2224/83598		Fillers	2224/83663		the principal constituent melting at a temperature of greater than 1550°C
2224/83599		Base material	2224/83664		Palladium [Pd] as principal constituent
2224/836		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/83666		Titanium [Ti] as principal constituent
2224/83601		the principal constituent melting at a temperature of less than 400°C	2224/83669		Platinum [Pt] as principal constituent
2224/83605		Gallium [Ga] as principal constituent	2224/8367		Zirconium [Zr] as principal constituent
2224/83609		Indium [In] as principal constituent	2224/83671		Chromium [Cr] as principal constituent
2224/83611		Tin [Sn] as principal constituent	2224/83672		Vanadium [V] as principal constituent
2224/83613		Bismuth [Bi] as principal constituent	2224/83673		Rhodium [Rh] as principal constituent
2224/83614		Thallium [Tl] as principal constituent	2224/83676		Ruthenium [Ru] as principal constituent
2224/83616		Lead [Pb] as principal constituent	2224/83678		Iridium [Ir] as principal constituent
2224/83617		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/83679		Niobium [Nb] as principal constituent
2224/83618		Zinc [Zn] as principal constituent	2224/8368		Molybdenum [Mo] as principal constituent
2224/8362		Antimony [Sb] as principal constituent	2224/83681		Tantalum [Ta] as principal constituent
2224/83623		Magnesium [Mg] as principal constituent	2224/83683		Rhenium [Re] as principal constituent
2224/83624		Aluminium [Al] as principal constituent	2224/83684		Tungsten [W] as principal constituent
2224/83638		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/83686		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83639		Silver [Ag] as principal constituent	2224/83687		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/83644		Gold [Au] as principal constituent	2224/83688		Glasses, e.g. amorphous oxides, nitrides or fluorides
			2224/8369		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
			2224/83691		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
			2224/83693		with a principal constituent of the material being a solid not provided for in groups H01L 2224/836 - H01L 2224/83691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/83694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/836 - H01L 2224/83691	2224/8376	Iron [Fe] as principal constituent
2224/83695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/836 - H01L 2224/83691	2224/83763	the principal constituent melting at a temperature of greater than 1550°C
2224/83698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/83764	Palladium [Pd] as principal constituent
2224/83699	Coating material	2224/83766	Titanium [Ti] as principal constituent
2224/837	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/83769	Platinum [Pt] as principal constituent
2224/83701	the principal constituent melting at a temperature of less than 400°C	2224/8377	Zirconium [Zr] as principal constituent
2224/83705	Gallium [Ga] as principal constituent	2224/83771	Chromium [Cr] as principal constituent
2224/83709	Indium [In] as principal constituent	2224/83772	Vanadium [V] as principal constituent
2224/83711	Tin [Sn] as principal constituent	2224/83773	Rhodium [Rh] as principal constituent
2224/83713	Bismuth [Bi] as principal constituent	2224/83776	Ruthenium [Ru] as principal constituent
2224/83714	Thallium [Tl] as principal constituent	2224/83778	Iridium [Ir] as principal constituent
2224/83716	Lead [Pb] as principal constituent	2224/83779	Niobium [Nb] as principal constituent
2224/83717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/8378	Molybdenum [Mo] as principal constituent
2224/83718	Zinc [Zn] as principal constituent	2224/83781	Tantalum [Ta] as principal constituent
2224/8372	Antimony [Sb] as principal constituent	2224/83783	Rhenium [Re] as principal constituent
2224/83723	Magnesium [Mg] as principal constituent	2224/83784	Tungsten [W] as principal constituent
2224/83724	Aluminium [Al] as principal constituent	2224/83786	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/83787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/83739	Silver [Ag] as principal constituent	2224/83788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/83744	Gold [Au] as principal constituent	2224/8379	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/83747	Copper [Cu] as principal constituent	2224/83791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/83749	Manganese [Mn] as principal constituent	2224/83793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/837 - H01L 2224/83791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/83755	Nickel [Ni] as principal constituent	2224/83794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/837 - H01L 2224/83791
2224/83757	Cobalt [Co] as principal constituent	2224/83795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/837 - H01L 2224/83791

- 2224/83798 with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2224/83799 Shape or distribution of the fillers
- 2224/838 . . . Bonding techniques
- 2224/83801 Soldering or alloying
- 2224/83805 involving forming a eutectic alloy at the bonding interface
- 2224/8381 involving forming an intermetallic compound at the bonding interface
- 2224/83815 Reflow soldering
- 2224/8382 Diffusion bonding
- 2224/83825 Solid-liquid interdiffusion
- 2224/8383 Solid-solid interdiffusion
- 2224/8384 Sintering
- 2224/8385 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/83851 being an anisotropic conductive adhesive
- 2224/83855 Hardening the adhesive by curing, i.e. thermosetting
- 2224/83856 Pre-cured adhesive, i.e. B-stage adhesive
- 2224/83859 Localised curing of parts of the layer connector
- 2224/83862 Heat curing
- 2224/83865 Microwave curing
- 2224/83868 Infrared [IR] curing
- 2224/83871 Visible light curing
- 2224/83874 Ultraviolet [UV] curing
- 2224/83877 Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8388 Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
- 2224/83885 Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/83855](#) - [H01L 2224/8388](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/83886 Involving a self-assembly process, e.g. self-agglomeration of a material dispersed in a fluid
- 2224/83887 Auxiliary means therefor, e.g. for self-assembly activation
- 2224/83888 with special adaptation of the surface of the body to be connected, e.g. surface shape specially adapted for the self-assembly process
- 2224/83889 involving the material of the bonding area, e.g. bonding pad
- 2224/8389 using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/83893 Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/83894 Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/83895 between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/83896 between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/83897 Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
- 2224/83898 Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
- 2224/83899 using resilient parts in the layer connector or in the bonding area
- 2224/839 . . . with the layer connector not providing any mechanical bonding
- 2224/83901 Pressing the layer connector against the bonding areas by means of another connector
- 2224/83902 by means of another layer connector
- 2224/83903 by means of a bump connector
- 2224/83904 by means of an encapsulation layer or foil
- 2224/83905 . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/838](#) - [H01L 2224/83904](#)
- 2224/83906 Specific sequence of method steps
- 2224/83907 Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
- 2224/83908 . . . involving monitoring, e.g. feedback loop
- 2224/83909 . . . Post-treatment of the layer connector or bonding area
- 2224/8391 Cleaning, e.g. oxide removal step, desmearing
- 2224/83911 Chemical cleaning, e.g. etching, flux
- 2224/83912 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/83913 Plasma cleaning
- 2224/83914 Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/83919 Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8391](#) - [H01L 2224/83914](#)
- 2224/8392 Applying permanent coating, e.g. protective coating
- 2224/8393 Reshaping
- 2224/83931 by chemical means, e.g. etching
- 2224/83935 by heating means, e.g. reflowing
- 2224/83937 using a polychromatic heating lamp
- 2224/83939 using a laser
- 2224/83941 Induction heating, i.e. eddy currents
- 2224/83943 using a flame torch, e.g. hydrogen torch
- 2224/83945 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/83947 by mechanical means, e.g. "pull-and-cut", pressing, stamping
- 2224/83948 Thermal treatments, e.g. annealing, controlled cooling
- 2224/83951 Forming additional members, e.g. for reinforcing, fillet sealant

2224/83986	. . .	Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence	2224/84121		Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/84	. .	using a strap connector	2224/84122		by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/84001	. . .	involving a temporary auxiliary member not forming part of the bonding apparatus	2224/84123		Shape or position of the body
2224/84002		being a removable or sacrificial coating	2224/84125		Bonding areas on the body
2224/84005		being a temporary substrate	2224/84127		Bonding areas outside the body
2224/84007	. . .	involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the strap connector during or after the bonding process	2224/84129		Shape or position of the other item
2224/84009	. . .	Pre-treatment of the connector and/or the bonding area	2224/8413		using marks formed on the semiconductor or solid-state body
2224/8401		Cleaning, e.g. oxide removal step, desmearing	2224/84132		using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/84011		Chemical cleaning, e.g. etching, flux	2224/84136		involving guiding structures, e.g. spacers or supporting members
2224/84012		Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow	2224/84138		the guiding structures being at least partially left in the finished device
2224/84013		Plasma cleaning	2224/84143		Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/84014		Thermal cleaning, e.g. decomposition, sublimation	2224/84148		involving movement of a part of the bonding apparatus
2224/84019		Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8401 - H01L 2224/84014	2224/84149		being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8402		Applying permanent coating, e.g. in-situ coating	2224/8415		Rotational movements
2224/8403		Reshaping	2224/8416		Translational movements
2224/84031		by chemical means, e.g. etching, anodisation	2224/84169		being the upper part of the bonding apparatus, i.e. bonding head,
2224/84035		by heating means, e.g. "free-air-ball"	2224/8417		Rotational movements
2224/84037		using a polychromatic heating lamp	2224/8418		Translational movements
2224/84039		using a laser	2224/84181		connecting first on the semiconductor or solid-state body, i.e. on-chip, regular stitch
2224/84041		Induction heating, i.e. eddy currents	2224/84186		connecting first outside the semiconductor or solid-state body, i.e. off-chip, reverse stitch
2224/84043		using a flame torch, e.g. hydrogen torch	2224/84191		connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches
2224/84045		using a corona discharge, e.g. electronic flame off [EFO]	2224/84196		involving intermediate connecting steps before cutting the strap connector
2224/84047		by mechanical means, e.g. severing, pressing, stamping	2224/842	. . .	Applying energy for connecting
2224/84048		Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling	2224/84201		Compression bonding
2224/84051		Forming additional members	2224/84203		Thermocompression bonding
2224/84053	. . .	Bonding environment	2224/84205		Ultrasonic bonding
2224/84054		Composition of the atmosphere	2224/84206		Direction of oscillation
2224/84055		being oxidating	2224/84207		Thermosonic bonding
2224/84065		being reducing	2224/8421		with energy being in the form of electromagnetic radiation
2224/84075		being inert	2224/84212		Induction heating, i.e. eddy currents
2224/84085		being a liquid (e.g. for fluidic self-assembly)	2224/84214		using a laser
2224/8409		Vacuum	2224/8423		Polychromatic or infrared lamp heating
2224/84091		Under pressure	2224/84232		using an autocatalytic reaction, e.g. exothermic brazing
2224/84092		Atmospheric pressure	2224/84234		using means for applying energy being within the device, e.g. integrated heater
2224/84093		Transient conditions, e.g. gas-flow	2224/84236		using electro-static corona discharge
2224/84095		Temperature settings	2224/84237		using an electron beam
2224/84096		Transient conditions	2224/84238		using electric resistance welding, i.e. ohmic heating
2224/84097		Heating			
2224/84098		Cooling			
2224/84099		Ambient temperature			
2224/841	. . .	the connector being supplied to the parts to be connected in the bonding apparatus			
2224/8411	. . .	involving protection against electrical discharge, e.g. removing electrostatic charge			
2224/8412	. . .	Aligning			

2224/8434	. . .	Bonding interfaces of the connector	2224/84476		Ruthenium [Ru] as principal constituent
2224/84345	. . .	Shape, e.g. interlocking features	2224/84478		Iridium [Ir] as principal constituent
2224/84355	. . .	having an external coating, e.g. protective bond-through coating	2224/84479		Niobium [Nb] as principal constituent
2224/84359	. . .	Material	2224/8448		Molybdenum [Mo] as principal constituent
2224/8436	. . .	Bonding interfaces of the semiconductor or solid state body	2224/84481		Tantalum [Ta] as principal constituent
2224/84365	. . .	Shape, e.g. interlocking features	2224/84483		Rhenium [Re] as principal constituent
2224/84375	. . .	having an external coating, e.g. protective bond-through coating	2224/84484		Tungsten [W] as principal constituent
2224/84379	. . .	Material	2224/84486		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/8438	. . .	Bonding interfaces outside the semiconductor or solid-state body	2224/84487		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/84385	. . .	Shape, e.g. interlocking features	2224/84488		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/84395	. . .	having an external coating, e.g. protective bond-through coating	2224/8449		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/84399	. . .	Material	2224/84491		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/844		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/84493		with a principal constituent of the material being a solid not provided for in groups H01L 2224/844 - H01L 2224/84491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84401		the principal constituent melting at a temperature of less than 400°C	2224/84494		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/844 - H01L 2224/84491
2224/84405		Gallium [Ga] as principal constituent	2224/84495		with a principal constituent of the material being a gas not provided for in groups H01L 2224/844 - H01L 2224/84491
2224/84409		Indium [In] as principal constituent	2224/84498		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/84411		Tin [Sn] as principal constituent	2224/84499		Material of the matrix
2224/84413		Bismuth [Bi] as principal constituent	2224/845		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84414		Thallium [Tl] as principal constituent	2224/84501		the principal constituent melting at a temperature of less than 400°C
2224/84416		Lead [Pb] as principal constituent	2224/84505		Gallium [Ga] as principal constituent
2224/84417		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/84509		Indium [In] as principal constituent
2224/84418		Zinc [Zn] as principal constituent	2224/84511		Tin [Sn] as principal constituent
2224/8442		Antimony [Sb] as principal constituent	2224/84513		Bismuth [Bi] as principal constituent
2224/84423		Magnesium [Mg] as principal constituent	2224/84514		Thallium [Tl] as principal constituent
2224/84424		Aluminium [Al] as principal constituent	2224/84516		Lead [Pb] as principal constituent
2224/84438		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/84517		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84439		Silver [Ag] as principal constituent	2224/84518		Zinc [Zn] as principal constituent
2224/84444		Gold [Au] as principal constituent	2224/8452		Antimony [Sb] as principal constituent
2224/84447		Copper [Cu] as principal constituent			
2224/84449		Manganese [Mn] as principal constituent			
2224/84455		Nickel [Ni] as principal constituent			
2224/84457		Cobalt [Co] as principal constituent			
2224/8446		Iron [Fe] as principal constituent			
2224/84463		the principal constituent melting at a temperature of greater than 1550°C			
2224/84464		Palladium [Pd] as principal constituent			
2224/84466		Titanium [Ti] as principal constituent			
2224/84469		Platinum [Pt] as principal constituent			
2224/8447		Zirconium [Zr] as principal constituent			
2224/84471		Chromium [Cr] as principal constituent			
2224/84472		Vanadium [V] as principal constituent			
2224/84473		Rhodium [Rh] as principal constituent			

2224/84523	.....	Magnesium [Mg] as principal constituent	2224/84591	.....	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/84524	.....	Aluminium [Al] as principal constituent	2224/84593	.....	with a principal constituent of the material being a solid not provided for in groups H01L 2224/845 - H01L 2224/84591 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84538	.....	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/84594	.....	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/845 - H01L 2224/84591
2224/84539	.....	Silver [Ag] as principal constituent	2224/84595	.....	with a principal constituent of the material being a gas not provided for in groups H01L 2224/845 - H01L 2224/84591
2224/84544	.....	Gold [Au] as principal constituent	2224/84598	.....	Fillers
2224/84547	.....	Copper [Cu] as principal constituent	2224/84599	.....	Base material
2224/84549	.....	Manganese [Mn] as principal constituent	2224/846	.....	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84555	.....	Nickel [Ni] as principal constituent	2224/84601	.....	the principal constituent melting at a temperature of less than 400°C
2224/84557	.....	Cobalt [Co] as principal constituent	2224/84605	.....	Gallium [Ga] as principal constituent
2224/8456	.....	Iron [Fe] as principal constituent	2224/84609	.....	Indium [In] as principal constituent
2224/84563	.....	the principal constituent melting at a temperature of greater than 1550°C	2224/84611	.....	Tin [Sn] as principal constituent
2224/84564	.....	Palladium [Pd] as principal constituent	2224/84613	.....	Bismuth [Bi] as principal constituent
2224/84566	.....	Titanium [Ti] as principal constituent	2224/84614	.....	Thallium [Tl] as principal constituent
2224/84569	.....	Platinum [Pt] as principal constituent	2224/84616	.....	Lead [Pb] as principal constituent
2224/8457	.....	Zirconium [Zr] as principal constituent	2224/84617	.....	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84571	.....	Chromium [Cr] as principal constituent	2224/84618	.....	Zinc [Zn] as principal constituent
2224/84572	.....	Vanadium [V] as principal constituent	2224/8462	.....	Antimony [Sb] as principal constituent
2224/84573	.....	Rhodium [Rh] as principal constituent	2224/84623	.....	Magnesium [Mg] as principal constituent
2224/84576	.....	Ruthenium [Ru] as principal constituent	2224/84624	.....	Aluminium [Al] as principal constituent
2224/84578	.....	Iridium [Ir] as principal constituent	2224/84638	.....	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84579	.....	Niobium [Nb] as principal constituent	2224/84639	.....	Silver [Ag] as principal constituent
2224/8458	.....	Molybdenum [Mo] as principal constituent	2224/84644	.....	Gold [Au] as principal constituent
2224/84581	.....	Tantalum [Ta] as principal constituent	2224/84647	.....	Copper [Cu] as principal constituent
2224/84583	.....	Rhenium [Re] as principal constituent	2224/84649	.....	Manganese [Mn] as principal constituent
2224/84584	.....	Tungsten [W] as principal constituent			
2224/84586	.....	with a principal constituent of the material being a non metallic, non metalloid inorganic material			
2224/84587	.....	Ceramics, e.g. crystalline carbides, nitrides or oxides			
2224/84588	.....	Glasses, e.g. amorphous oxides, nitrides or fluorides			
2224/8459	.....	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy			

2224/84655	Nickel [Ni] as principal constituent	2224/84695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/846 - H01L 2224/84691
2224/84657	Cobalt [Co] as principal constituent	2224/84698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/8466	Iron [Fe] as principal constituent	2224/84699	Coating material
2224/84663	the principal constituent melting at a temperature of greater than 1550°C	2224/847	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84664	Palladium [Pd] as principal constituent	2224/84701	the principal constituent melting at a temperature of less than 400°C
2224/84666	Titanium [Ti] as principal constituent	2224/84705	Gallium [Ga] as principal constituent
2224/84669	Platinum [Pt] as principal constituent	2224/84709	Indium [In] as principal constituent
2224/8467	Zirconium [Zr] as principal constituent	2224/84711	Tin [Sn] as principal constituent
2224/84671	Chromium [Cr] as principal constituent	2224/84713	Bismuth [Bi] as principal constituent
2224/84672	Vanadium [V] as principal constituent	2224/84714	Thallium [Tl] as principal constituent
2224/84673	Rhodium [Rh] as principal constituent	2224/84716	Lead [Pb] as principal constituent
2224/84676	Ruthenium [Ru] as principal constituent	2224/84717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84678	Iridium [Ir] as principal constituent	2224/84718	Zinc [Zn] as principal constituent
2224/84679	Niobium [Nb] as principal constituent	2224/8472	Antimony [Sb] as principal constituent
2224/8468	Molybdenum [Mo] as principal constituent	2224/84723	Magnesium [Mg] as principal constituent
2224/84681	Tantalum [Ta] as principal constituent	2224/84724	Aluminium [Al] as principal constituent
2224/84683	Rhenium [Re] as principal constituent	2224/84738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84684	Tungsten [W] as principal constituent	2224/84739	Silver [Ag] as principal constituent
2224/84686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/84744	Gold [Au] as principal constituent
2224/84687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/84747	Copper [Cu] as principal constituent
2224/84688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/84749	Manganese [Mn] as principal constituent
2224/8469	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/84755	Nickel [Ni] as principal constituent
2224/84691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/84757	Cobalt [Co] as principal constituent
2224/84693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/846 - H01L 2224/84691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/8476	Iron [Fe] as principal constituent
2224/84694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/846 - H01L 2224/84691	2224/84763	the principal constituent melting at a temperature of greater than 1550°C

2224/84764		Palladium [Pd] as principal constituent	2224/84801		Soldering or alloying
2224/84766		Titanium [Ti] as principal constituent	2224/84805		involving forming a eutectic alloy at the bonding interface
2224/84769		Platinum [Pt] as principal constituent	2224/8481		involving forming an intermetallic compound at the bonding interface
2224/8477		Zirconium [Zr] as principal constituent	2224/84815		Reflow soldering
2224/84771		Chromium [Cr] as principal constituent	2224/8482		Diffusion bonding
2224/84772		Vanadium [V] as principal constituent	2224/84825		Solid-liquid interdiffusion
2224/84773		Rhodium [Rh] as principal constituent	2224/8483		Solid-solid interdiffusion
2224/84776		Ruthenium [Ru] as principal constituent	2224/8484		Sintering
2224/84778		Iridium [Ir] as principal constituent	2224/8485		using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/84779		Niobium [Nb] as principal constituent	2224/84855		Hardening the adhesive by curing, i.e. thermosetting
2224/8478		Molybdenum [Mo] as principal constituent	2224/84856		Pre-cured adhesive, i.e. B-stage adhesive
2224/84781		Tantalum [Ta] as principal constituent	2224/84859		Localised curing of parts of the connector
2224/84783		Rhenium [Re] as principal constituent	2224/84862		Heat curing
2224/84784		Tungsten [W] as principal constituent	2224/84865		Microwave curing
2224/84786		with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/84868		Infrared [IR] curing
2224/84787		Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/84871		Visible light curing
2224/84788		Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/84874		Ultraviolet [UV] curing
2224/8479		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/84877		Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/84791		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/8488		Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/84793		with a principal constituent of the material being a solid not provided for in groups H01L 2224/847 - H01L 2224/84791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/84885		Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/84855 - H01L 2224/8488 , e.g. for hybrid thermoplastic-thermosetting adhesives
2224/84794		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/847 - H01L 2224/84791	2224/8489		using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/84795		with a principal constituent of the material being a gas not provided for in groups H01L 2224/847 - H01L 2224/84791	2224/84893		Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/84798		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/84895		Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/84799		Shape or distribution of the fillers	2224/84897		between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/848		Bonding techniques	2224/84898		between electrically insulating surfaces, e.g. oxide or nitride layersg
			2224/84899		Combinations of bonding methods provided for in at least two different groups from H01L 2224/848 - H01L 2224/84898
			2224/849		involving monitoring, e.g. feedback loop
			2224/84909		Post-treatment of the connector or bonding area
			2224/8491		Cleaning, e.g. oxide removal step, desmearing
			2224/84911		Chemical cleaning, e.g. etching, flux
			2224/84912		Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
			2224/84913		Plasma cleaning
			2224/84914		Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge

2224/84919		Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8491 - H01L 2224/84914	2224/85045		using a corona discharge, e.g. electronic flame off [EFO]
2224/8492		Applying permanent coating, e.g. protective coating	2224/85047		by mechanical means, e.g. severing, pressing, stamping
2224/8493		Reshaping, e.g. for severing the strap, modifying the loop shape	2224/85048		Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/84931		by chemical means, e.g. etching	2224/85051		Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-ball" connections
2224/84935		by heating means, e.g. reflowing	2224/85053		Bonding environment
2224/84937		using a polychromatic heating lamp	2224/85054		Composition of the atmosphere
2224/84939		using a laser	2224/85055		being oxidating
2224/84941		Induction heating, i.e. eddy currents	2224/85065		being reducing
2224/84943		using a flame torch, e.g. hydrogen torch	2224/85075		being inert
2224/84945		using a corona discharge, e.g. electronic flame off [EFO]	2224/85085		being a liquid, e.g. for fluidic self-assembly
2224/84947		by mechanical means, e.g. pressing, stamping	2224/8509		Vacuum
2224/84948		Thermal treatments, e.g. annealing, controlled cooling	2224/85091		Under pressure
2224/84951		Forming additional members, e.g. for reinforcing	2224/85092		Atmospheric pressure
2224/84986		Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence	2224/85093		Transient conditions, e.g. gas-flow
2224/85		using a wire connector	2224/85095		Temperature settings
2224/85001		involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate	2224/85096		Transient conditions
2224/85002		being a removable or sacrificial coating	2224/85097		Heating
2224/85005		being a temporary or sacrificial substrate	2224/85098		Cooling
2224/85007		involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process	2224/85099		Ambient temperature
2224/85009		Pre-treatment of the connector or the bonding area	2224/851		the connector being supplied to the parts to be connected in the bonding apparatus
2224/8501		Cleaning, e.g. oxide removal step, desmearing	2224/8511		involving protection against electrical discharge, e.g. removing electrostatic charge
2224/85011		Chemical cleaning, e.g. etching, flux	2224/8512		Aligning
2224/85012		Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow	2224/85121		Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/85013		Plasma cleaning	2224/85122		by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/85014		Thermal cleaning, e.g. decomposition, sublimation	2224/85123		Shape or position of the body
2224/85016		using a laser	2224/85125		Bonding areas on the body
2224/85017		Electron beam cleaning	2224/85127		Bonding areas outside the body
2224/85019		Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 - H01L 2224/85014	2224/85129		Shape or position of the other item
2224/8502		Applying permanent coating, e.g. in-situ coating	2224/8513		using marks formed on the semiconductor or solid-state body
2224/8503		Reshaping, e.g. forming the ball or the wedge of the wire connector	2224/85132		using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/85031		by chemical means, e.g. etching, anodisation	2224/85136		involving guiding structures, e.g. spacers or supporting members
2224/85035		by heating means, e.g. "free-air-ball"	2224/85138		the guiding structures being at least partially left in the finished device
2224/85037		using a polychromatic heating lamp	2224/85143		Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/85039		using a laser	2224/85148		involving movement of a part of the bonding apparatus
2224/85041		Induction heating, i.e. eddy currents	2224/85149		being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/85043		using a flame torch, e.g. hydrogen torch	2224/8515		Rotational movements
			2224/8516		Translational movements
			2224/85169		being the upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge
			2224/8517		Rotational movements
			2224/8518		Translational movements

2224/85181		connecting first on the semiconductor or solid-state body, i.e. on-chip, regular stitch	2224/85417		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/85186		connecting first outside the semiconductor or solid-state body, i.e. off-chip, reverse stitch	2224/85418		Zinc (Zn) as principal constituent
2224/85191		connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches	2224/8542		Antimony (Sb) as principal constituent
2224/85196		involving intermediate connecting steps before cutting the wire connector	2224/85423		Magnesium (Mg) as principal constituent
2224/852	. . .	Applying energy for connecting	2224/85424		Aluminium (Al) as principal constituent
2224/85201		Compression bonding	2224/85438		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/85203		Thermocompression bonding	2224/85439		Silver (Ag) as principal constituent
2224/85205		Ultrasonic bonding	2224/85444		Gold (Au) as principal constituent
2224/85206		Direction of oscillation	2224/85447		Copper (Cu) as principal constituent
2224/85207		Thermosonic bonding	2224/85449		Manganese (Mn) as principal constituent
2224/8521		with energy being in the form of electromagnetic radiation	2224/85455		Nickel (Ni) as principal constituent
2224/85212		Induction heating, i.e. eddy currents	2224/85457		Cobalt (Co) as principal constituent
2224/85214		using a laser	2224/8546		Iron (Fe) as principal constituent
2224/8523		Polychromatic or infrared lamp heating	2224/85463		the principal constituent melting at a temperature of greater than 1550°C
2224/85232		using an autocatalytic reaction, e.g. exothermic brazing	2224/85464		Palladium (Pd) as principal constituent
2224/85234		using means for applying energy being within the device, e.g. integrated heater	2224/85466		Titanium (Ti) as principal constituent
2224/85236		using electro-static corona discharge	2224/85469		Platinum (Pt) as principal constituent
2224/85237		using electron beam	2224/8547		Zirconium (Zr) as principal constituent
2224/85238		using electric resistance welding, i.e. ohmic heating	2224/85471		Chromium (Cr) as principal constituent
2224/8534	. . .	Bonding interfaces of the connector	2224/85472		Vanadium (V) as principal constituent
2224/85345		Shape, e.g. interlocking features	2224/85473		Rhodium (Rh) as principal constituent
2224/85355		having an external coating, e.g. protective bond-through coating	2224/85476		Ruthenium (Ru) as principal constituent
2224/85359		Material	2224/85478		Iridium (Ir) as principal constituent
2224/8536	. . .	Bonding interfaces of the semiconductor or solid state body	2224/85479		Niobium (Nb) as principal constituent
2224/85365		Shape, e.g. interlocking features	2224/8548		Molybdenum (Mo) as principal constituent
2224/85375		having an external coating, e.g. protective bond-through coating	2224/85481		Tantalum (Ta) as principal constituent
2224/85379		Material	2224/85483		Rhenium (Re) as principal constituent
2224/8538	. . .	Bonding interfaces outside the semiconductor or solid-state body	2224/85484		Tungsten (W) as principal constituent
2224/85385		Shape, e.g. interlocking features	2224/85486		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85395		having an external coating, e.g. protective bond-through coating	2224/85487		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/85399		Material	2224/85488		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/854		with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/8549		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85401		the principal constituent melting at a temperature of less than 400°C	2224/85491		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85405		Gallium (Ga) as principal constituent	2224/85493		with a principal constituent of the material being a solid not provided for in groups H01L 2224/854 - H01L 2224/85491 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85409		Indium (In) as principal constituent	2224/85494		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/854 - H01L 2224/85491
2224/85411		Tin (Sn) as principal constituent			
2224/85413		Bismuth (Bi) as principal constituent			
2224/85414		Thallium (Tl) as principal constituent			
2224/85416		Lead (Pb) as principal constituent			

2224/85495		with a principal constituent of the material being a gas not provided for in groups H01L 2224/854 - H01L 2224/85491	2224/8557		Zirconium (Zr) as principal constituent
2224/85498		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/85571		Chromium (Cr) as principal constituent
2224/85499		Material of the matrix	2224/85572		Vanadium (V) as principal constituent
2224/855		with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/85573		Rhodium (Rh) as principal constituent
2224/85501		the principal constituent melting at a temperature of less than 400°C	2224/85576		Ruthenium (Ru) as principal constituent
2224/85505		Gallium (Ga) as principal constituent	2224/85578		Iridium (Ir) as principal constituent
2224/85509		Indium (In) as principal constituent	2224/85579		Niobium (Nb) as principal constituent
2224/85511		Tin (Sn) as principal constituent	2224/8558		Molybdenum (Mo) as principal constituent
2224/85513		Bismuth (Bi) as principal constituent	2224/85581		Tantalum (Ta) as principal constituent
2224/85514		Thallium (Tl) as principal constituent	2224/85583		Rhenium (Re) as principal constituent
2224/85516		Lead (Pb) as principal constituent	2224/85584		Tungsten (W) as principal constituent
2224/85517		the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/85586		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85518		Zinc (Zn) as principal constituent	2224/85587		Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/8552		Antimony (Sb) as principal constituent	2224/85588		Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/85523		Magnesium (Mg) as principal constituent	2224/8559		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85524		Aluminium (Al) as principal constituent	2224/85591		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85538		the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/85593		with a principal constituent of the material being a solid not provided for in groups H01L 2224/855 - H01L 2224/85591 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85539		Silver (Ag) as principal constituent	2224/85594		with a principal constituent of the material being a liquid not provided for in groups H01L 2224/855 - H01L 2224/85591
2224/85544		Gold (Au) as principal constituent	2224/85595		with a principal constituent of the material being a gas not provided for in groups H01L 2224/855 - H01L 2224/85591
2224/85547		Copper (Cu) as principal constituent	2224/85598		Fillers
2224/85549		Manganese (Mn) as principal constituent	2224/85599		Base material
2224/85555		Nickel (Ni) as principal constituent	2224/856		with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85557		Cobalt (Co) as principal constituent	2224/85601		the principal constituent melting at a temperature of less than 400°C
2224/8556		Iron (Fe) as principal constituent	2224/85605		Gallium (Ga) as principal constituent
2224/85563		the principal constituent melting at a temperature of greater than 1550°C	2224/85609		Indium (In) as principal constituent
2224/85564		Palladium (Pd) as principal constituent			
2224/85566		Titanium (Ti) as principal constituent			
2224/85569		Platinum (Pt) as principal constituent			

2224/85611	Tin (Sn) as principal constituent	2224/85681	Tantalum (Ta) as principal constituent
2224/85613	Bismuth (Bi) as principal constituent	2224/85683	Rhenium (Re) as principal constituent
2224/85614	Thallium (Tl) as principal constituent	2224/85684	Tungsten (W) as principal constituent
2224/85616	Lead (Pb) as principal constituent	2224/85686	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/85687	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/85618	Zinc (Zn) as principal constituent	2224/85688	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8562	Antimony (Sb) as principal constituent	2224/8569	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85623	Magnesium (Mg) as principal constituent	2224/85691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85624	Aluminium (Al) as principal constituent	2224/85693	with a principal constituent of the material being a solid not provided for in groups H01L 2224/856 - H01L 2224/85691 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/85694	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/856 - H01L 2224/85691
2224/85639	Silver (Ag) as principal constituent	2224/85695	with a principal constituent of the material being a gas not provided for in groups H01L 2224/856 - H01L 2224/85691
2224/85644	Gold (Au) as principal constituent	2224/85698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85647	Copper (Cu) as principal constituent	2224/85699	Coating material
2224/85649	Manganese (Mn) as principal constituent	2224/857	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85655	Nickel (Ni) as principal constituent	2224/85701	the principal constituent melting at a temperature of less than 400°C
2224/85657	Cobalt (Co) as principal constituent	2224/85705	Gallium (Ga) as principal constituent
2224/8566	Iron (Fe) as principal constituent	2224/85709	Indium (In) as principal constituent
2224/85663	the principal constituent melting at a temperature of greater than 1550°C	2224/85711	Tin (Sn) as principal constituent
2224/85664	Palladium (Pd) as principal constituent	2224/85713	Bismuth (Bi) as principal constituent
2224/85666	Titanium (Ti) as principal constituent	2224/85714	Thallium (Tl) as principal constituent
2224/85669	Platinum (Pt) as principal constituent	2224/85716	Lead (Pb) as principal constituent
2224/8567	Zirconium (Zr) as principal constituent		
2224/85671	Chromium (Cr) as principal constituent		
2224/85672	Vanadium (V) as principal constituent		
2224/85673	Rhodium (Rh) as principal constituent		
2224/85676	Ruthenium (Ru) as principal constituent		
2224/85678	Iridium (Ir) as principal constituent		
2224/85679	Niobium (Nb) as principal constituent		
2224/8568	Molybdenum (Mo) as principal constituent		

2224/85717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/85787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/85718	Zinc (Zn) as principal constituent	2224/85788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8572	Antimony (Sb) as principal constituent	2224/8579	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85723	Magnesium (Mg) as principal constituent	2224/85791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85724	Aluminium (Al) as principal constituent	2224/85793	with a principal constituent of the material being a solid not provided for in groups H01L 2224/857 - H01L 2224/85791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/85794	with a principal constituent of the material being a liquid not provided for in groups H01L 2224/857 - H01L 2224/85791
2224/85739	Silver (Ag) as principal constituent	2224/85795	with a principal constituent of the material being a gas not provided for in groups H01L 2224/857 - H01L 2224/85791
2224/85744	Gold (Au) as principal constituent	2224/85798	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85747	Copper (Cu) as principal constituent	2224/85799	Shape or distribution of the fillers
2224/85749	Manganese (Mn) as principal constituent	2224/858	Bonding techniques
2224/85755	Nickel (Ni) as principal constituent	2224/85801	Soldering or alloying
2224/85757	Cobalt (Co) as principal constituent	2224/85805	involving forming a eutectic alloy at the bonding interface
2224/8576	Iron (Fe) as principal constituent	2224/8581	involving forming an intermetallic compound at the bonding interface
2224/85763	the principal constituent melting at a temperature of greater than 1550°C	2224/85815	Reflow soldering
2224/85764	Palladium (Pd) as principal constituent	2224/8582	Diffusion bonding
2224/85766	Titanium (Ti) as principal constituent	2224/85825	Solid-liquid interdiffusion
2224/85769	Platinum (Pt) as principal constituent	2224/8583	Solid-solid interdiffusion, e.g. "direct bonding"
2224/8577	Zirconium (Zr) as principal constituent	2224/8584	Sintering
2224/85771	Chromium (Cr) as principal constituent	2224/8585	using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/85772	Vanadium (V) as principal constituent	2224/85855	Hardening the adhesive by curing, i.e. thermosetting
2224/85773	Rhodium (Rh) as principal constituent	2224/85856	Pre-cured adhesive, i.e. B-stage adhesive
2224/85776	Ruthenium (Ru) as principal constituent	2224/85859	Localised curing of parts of the connector
2224/85778	Iridium (Ir) as principal constituent	2224/85862	Heat curing
2224/85779	Niobium (Nb) as principal constituent	2224/85865	Microwave curing
2224/8578	Molybdenum (Mo) as principal constituent	2224/85868	Infrared [IR] curing
2224/85781	Tantalum (Ta) as principal constituent	2224/85871	Visible light curing
2224/85783	Rhenium (Re) as principal constituent	2224/85874	Ultraviolet [UV] curing
2224/85784	Tungsten (W) as principal constituent	2224/85877	Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/85786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/8588	Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives

- 2224/85885 Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/85855](#) - [H01L 2224/8588](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/8589 using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/85893 Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/85895 Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/85897 between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/85898 between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/85899 Combinations of bonding methods provided for in at least two different groups from [H01L 2224/858](#) - [H01L 2224/85898](#)
- 2224/859 involving monitoring, e.g. feedback loop
- 2224/85909 Post-treatment of the connector or wire bonding area
- 2224/8591 Cleaning, e.g. oxide removal step, desmearing
- 2224/85911 Chemical cleaning, e.g. etching, flux
- 2224/85912 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/85913 Plasma cleaning
- 2224/85914 Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/85916 using a laser
- 2224/85917 Electron beam cleaning
- 2224/85919 Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8591](#) - [H01L 2224/85914](#)
- 2224/8592 Applying permanent coating, e.g. protective coating
- 2224/8593 Reshaping, e.g. for severing the wire, modifying the wedge or ball or the loop shape
- 2224/85931 by chemical means, e.g. etching
- 2224/85935 by heating means, e.g. reflowing
- 2224/85937 using a polychromatic heating lamp
- 2224/85939 using a laser
- 2224/85941 Induction heating, i.e. eddy currents
- 2224/85943 using a flame torch, e.g. hydrogen torch
- 2224/85945 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/85947 by mechanical means, e.g. "pull-and-cut", pressing, stamping
- 2224/85948 Thermal treatments, e.g. annealing, controlled cooling
- 2224/85951 Forming additional members, e.g. for reinforcing
- 2224/85986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/86 using tape automated bonding [TAB]
- 2224/86001 involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/86002 being a removable or sacrificial coating
- 2224/86005 being a temporary or sacrificial substrate
- 2224/86007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the TAB connector during or after the bonding process
- 2224/86009 Pre-treatment of the connector or the bonding area
- 2224/8601 Cleaning, e.g. oxide removal step, desmearing
- 2224/8603 Reshaping
- 2224/86031 by chemical means, e.g. etching, anodisation
- 2224/86035 by heating
- 2224/86039 using a laser
- 2224/86045 using a corona discharge, e.g. electronic flame off [EFO]
- 2224/86047 by mechanical means, e.g. severing, pressing, stamping
- 2224/86048 Thermal treatment, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/86051 Forming additional members
- 2224/86053 Bonding environment
- 2224/86054 Composition of the atmosphere
- 2224/86085 being a liquid, e.g. fluidic self-assembly
- 2224/8609 Vacuum
- 2224/86091 Under pressure
- 2224/86095 Temperature settings
- 2224/86096 Transient conditions
- 2224/86097 Heating
- 2224/86098 Cooling
- 2224/86099 Ambient temperature
- 2224/861 the connector being supplied to the parts to be connected in the bonding apparatus
- 2224/8611 involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8612 Aligning
- 2224/86121 Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/86122 by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/8613 using marks formed on the semiconductor or solid-state body
- 2224/86132 using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/86136 involving guiding structures, e.g. spacers or supporting members
- 2224/86138 the guiding structures being at least partially left in the finished device
- 2224/86143 Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/86148 involving movement of a part of the bonding apparatus
- 2224/86149 being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8615 Rotational movements
- 2224/8616 Translational movements

2224/86169		being the upper part of the bonding apparatus, e.g. nozzle	2224/86856		Pre-cured adhesive, i.e. B-stage adhesive
2224/8617		Rotational movement	2224/86859		Localised curing of parts of the connector
2224/8618		Translational movements	2224/86862		Heat curing
2224/86181		connecting first on the semiconductor or solid-state body, i.e. on-chip,	2224/86865		Microwave curing
2224/86186		connecting first outside the semiconductor or solid-state body, i.e. off-chip	2224/86868		Infrared [IR] curing
2224/86191		connecting first both on and outside the semiconductor or solid-state body	2224/86871		Visible light curing
2224/862		Applying energy for connecting	2224/86874		Ultraviolet [UV] curing
2224/86201		Compression bonding	2224/86877		Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/86203		Thermo-compression bonding	2224/8688		Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/86205		Ultrasonic bonding	2224/86885		Combinations of two or more hardening methods provided for in at least two different groups selected from H01L 2224/86855 - H01L 2224/8688 , e.g. hybrid thermoplastic-thermosetting adhesives
2224/86207		Thermosonic bonding	2224/8689		using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/8621		with energy being in the form of electromagnetic radiation	2224/86893		Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/86212		Induction heating, i.e. eddy currents	2224/86895		Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/86214		using a laser	2224/86896		between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/8623		Polychromatic or infrared lamp heating	2224/86897		between electrically insulating surfaces, e.g. oxide or nitride layers
2224/86232		using an autocatalytic reaction, e.g. exothermic brazing	2224/86899		Combinations of bonding methods provided for in at least two different groups from H01L 2224/868 - H01L 2224/86897
2224/86234		using means for applying energy being within the device, e.g. integrated heater	2224/869		involving monitoring, e.g. feedback loop
2224/86236		using electro-static corona discharge	2224/86909		Post-treatment of the connector or the bonding area
2224/86237		using electron beam	2224/8691		Cleaning, e.g. oxide removal step, desmearing
2224/86238		using electric resistance welding, i.e. ohmic heating	2224/8693		Reshaping
2224/8634		Bonding interfaces of the connector	2224/86931		by chemical means, e.g. etching, anodisation
2224/86345		Shape, e.g. interlocking features	2224/86935		by heating means
2224/86355		having an external coating, e.g. protective bond-through coating	2224/86939		using a laser
2224/86359		Material	2224/86945		using a corona discharge, e.g. electronic flame off [EFO]
2224/8636		Bonding interfaces of the semiconductor or solid state body	2224/86947		by mechanical means, e.g. severing, pressing, stamping
2224/86365		Shape, e.g. interlocking features	2224/86948		Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/86375		having an external coating, e.g. protective bond-through coating	2224/86951		Forming additional members
2224/86379		Material	2224/86986		Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/8638		Bonding interfaces outside the semiconductor or solid-state body	2224/89		using at least one connector not provided for in any of the groups H01L 2224/81 - H01L 2224/86
2224/86385		Shape, e.g. interlocking features	2224/90		Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips
2224/86395		having an external coating, e.g. protective bond-through coating			
2224/86399		Material			
2224/868		Bonding techniques			
2224/86801		Soldering or alloying			
2224/86805		involving forming a eutectic alloy at the bonding interface			
2224/8681		involving forming an intermetallic compound at the bonding interface			
2224/86815		Reflow soldering			
2224/8682		Diffusion bonding			
2224/86825		Solid-liquid interdiffusion			
2224/8683		Solid-solid interdiffusion			
2224/8684		Sintering			
2224/8685		using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester			
2224/86855		Hardening the adhesive by curing, i.e. thermosetting			

- 2224/91 Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups [H01L 2224/80](#) - [H01L 2224/90](#)
- 2224/92 Specific sequence of method steps
- 2224/9201 Forming connectors during the connecting process, e.g. in-situ formation of bumps
- 2224/9202 Forming additional connectors after the connecting process
- 2224/9205 Intermediate bonding steps, i.e. partial connection of the semiconductor or solid-state body during the connecting process
- 2224/921 Connecting a surface with connectors of different types
- 2224/9211 Parallel connecting processes
- 2224/9212 Sequential connecting processes
- 2224/92122 the first connecting process involving a bump connector
- 2224/92124 the second connecting process involving a build-up interconnect
- 2224/92125 the second connecting process involving a layer connector
- 2224/92127 the second connecting process involving a wire connector
- 2224/92132 the first connecting process involving a build-up interconnect
- 2224/92133 the second connecting process involving a bump connector
- 2224/92135 the second connecting process involving a layer connector
- 2224/92136 the second connecting process involving a strap connector
- 2224/92137 the second connecting process involving a wire connector
- 2224/92138 the second connecting process involving a TAB connector
- 2224/92142 the first connecting process involving a layer connector
- 2224/92143 the second connecting process involving a bump connector
- 2224/92144 the second connecting process involving a build-up interconnect
- 2224/92147 the second connecting process involving a wire connector
- 2224/92148 the second connecting process involving a TAB connector
- 2224/92152 the first connecting process involving a strap connector
- 2224/92153 the second connecting process involving a bump connector
- 2224/92155 the second connecting process involving a layer connector
- 2224/92157 the second connecting process involving a wire connector
- 2224/92158 the second connecting process involving a TAB connector
- 2224/92162 the first connecting process involving a wire connector
- 2224/92163 the second connecting process involving a bump connector
- 2224/92164 the second connecting process involving a build-up interconnect
- 2224/92165 the second connecting process involving a layer connector
- 2224/92166 the second connecting process involving a strap connector
- 2224/92168 the second connecting process involving a TAB connector
- 2224/92172 the first connecting process involving a TAB connector
- 2224/92173 the second connecting process involving a bump connector
- 2224/92174 the second connecting process involving a build-up interconnect
- 2224/92175 the second connecting process involving a layer connector
- 2224/92176 the second connecting process involving a strap connector
- 2224/92177 the second connecting process involving a wire connector
- 2224/922 Connecting different surfaces of the semiconductor or solid-state body with connectors of different types
- 2224/9221 Parallel connecting processes
- 2224/9222 Sequential connecting processes
- 2224/92222 the first connecting process involving a bump connector
- 2224/92224 the second connecting process involving a build-up interconnect
- 2224/92225 the second connecting process involving a layer connector
- 2224/92226 the second connecting process involving a strap connector
- 2224/92227 the second connecting process involving a wire connector
- 2224/92228 the second connecting process involving a TAB connector
- 2224/92242 the first connecting process involving a layer connector
- 2224/92244 the second connecting process involving a build-up interconnect
- 2224/92246 the second connecting process involving a strap connector
- 2224/92247 the second connecting process involving a wire connector
- 2224/92248 the second connecting process involving a TAB connector
- 2224/92252 the first connecting process involving a strap connector
- 2224/92253 the second connecting process involving a bump connector
- 2224/92255 the second connecting process involving a layer connector
- 2224/93 Batch processes
- 2224/94 at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices
- 2224/95 at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips
- 2224/95001 involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate
- 2224/95053 Bonding environment
- 2224/95085 being a liquid, e.g. for fluidic self-assembly
- 2224/95091 Under pressure
- 2224/95092 Atmospheric pressure, e.g. dry self-assembly

2224/95093		Transient conditions, e.g. assisted by a gas flow or a liquid flow	2225/06524		Electrical connections formed on device or on substrate, e.g. a deposited or grown layer
2224/951	. . .	Supplying the plurality of semiconductor or solid-state bodies	2225/06527		Special adaptation of electrical connections, e.g. rewiring, engineering changes, pressure contacts, layout
2224/95101		in a liquid medium	2225/06531		Non-galvanic coupling, e.g. capacitive coupling
2224/95102		being a colloidal droplet	2225/06534		Optical coupling
2224/9511		using a rack or rail	2225/06537		Electromagnetic shielding
2224/95115		using a roll-to-roll transfer technique	2225/06541		Conductive via connections through the device, e.g. vertical interconnects, through silicon via [TSV]
2224/9512	. . .	Aligning the plurality of semiconductor or solid-state bodies	2225/06544		Design considerations for via connections, e.g. geometry or layout
2224/95121		Active alignment, i.e. by apparatus steering	2225/06548		Conductive via connections through the substrate, container, or encapsulation
2224/95122		by applying vibration	2225/06551		Conductive connections on the side of the device
2224/95123		by applying a pressurised fluid flow, e.g. liquid or gas flow	2225/06555		Geometry of the stack, e.g. form of the devices, geometry to facilitate stacking
2224/95133		by applying an electromagnetic field	2225/06558		the devices having passive surfaces facing each other, i.e. in a back-to-back arrangement
2224/95134		Electrowetting, i.e. by changing the surface energy of a droplet	2225/06562		at least one device in the stack being rotated or offset
2224/95136		involving guiding structures, e.g. shape matching, spacers or supporting members	2225/06565		the devices having the same size and there being no auxiliary carrier between the devices
2224/95143		Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium	2225/06568		the devices decreasing in size, e.g. pyramidal stack
2224/95144		Magnetic alignment, i.e. using permanent magnetic parts in the semiconductor or solid-state body	2225/06572		Auxiliary carrier between devices, the carrier having an electrical connection structure
2224/95145		Electrostatic alignment, i.e. polarity alignment with Coulomb charges	2225/06575		Auxiliary carrier between devices, the carrier having no electrical connection structure
2224/95146		by surface tension	2225/06579		TAB carriers; beam leads
2224/95147		by molecular lock-key, e.g. by DNA	2225/06582		Housing for the assembly, e.g. chip scale package [CSP]
2224/95148		involving movement of a part of the bonding apparatus	2225/06586		Housing with external bump or bump-like connectors
2224/96	. . .	the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual assemblies after connecting	2225/06589		Thermal management, e.g. cooling
2224/97	. . .	the devices being connected to a common substrate, e.g. interposer, said common substrate being separable into individual assemblies after connecting	2225/06593		Mounting aids permanently on device; arrangements for alignment
2224/98	. .	Methods for disconnecting semiconductor or solid-state bodies	2225/06596		Structural arrangements for testing
2225/00	Details relating to assemblies covered by the group H01L 25/00 but not provided for in its subgroups				
2225/03	. . .	All the devices being of a type provided for in the same main group of the same subclass of class H10 , e.g. assemblies of rectifier diodes	2225/10	. .	the devices having separate containers
2225/04	. .	the devices not having separate containers	2225/1005	. . .	the devices being integrated devices of class H10
2225/065	. . .	All the devices being of a type provided for in the same main group of the same subclass of class H10	2225/1011		the containers being in a stacked arrangement
2225/06503		Stacked arrangements of devices	2225/1017		the lowermost container comprising a device support
2225/06506		Wire or wire-like electrical connections between devices	2225/1023		the support being an insulating substrate
2225/0651		Wire or wire-like electrical connections from device to substrate	2225/1029		the support being a lead frame
2225/06513		Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps	2225/1035		the device being entirely enclosed by the support, e.g. high-density interconnect [HDI]
2225/06517		Bump or bump-like direct electrical connections from device to substrate	2225/1041		Special adaptations for top connections of the lowermost container, e.g. redistribution layer, integral interposer
2225/0652		Bump or bump-like direct electrical connections from substrate to substrate	2225/1047		Details of electrical connections between containers
			2225/1052		Wire or wire-like electrical connections

2225/1058		Bump or bump-like electrical connections, e.g. balls, pillars, posts	2924/01024	. .	Chromium [Cr]			
2225/1064		Electrical connections provided on a side surface of one or more of the containers	2924/01025	. .	Manganese [Mn]			
2225/107		Indirect electrical connections, e.g. via an interposer, a flexible substrate, using TAB	2924/01026	. .	Iron [Fe]			
2225/1076		Shape of the containers	2924/01027	. .	Cobalt [Co]			
2225/1082		for improving alignment between containers, e.g. interlocking features	2924/01028	. .	Nickel [Ni]			
2225/1088		Arrangements to limit the height of the assembly	2924/01029	. .	Copper [Cu]			
2225/1094		Thermal management, e.g. cooling	2924/0103	. .	Zinc [Zn]			
2924/00	Indexing scheme for arrangements or methods for connecting or disconnecting semiconductor or solid-state bodies as covered by H01L 24/00					2924/01031	. .	Gallium [Ga]
2924/0001	. .	Technical content checked by a classifier	2924/01032	. .	Germanium [Ge]	2924/01033	. .	Arsenic [As]
NOTE			2924/01034	. .	Selenium [Se]	2924/01035	. .	Bromine [Br]
Codes H01L 2924/0001 - H01L 2924/0002 are used to describe the status of reclassification; they do not relate to technical features as such			2924/01036	. .	Krypton [Kr]	2924/01037	. .	Rubidium [Rb]
2924/00011	. .	Not relevant to the scope of the group, the symbol of which is combined with the symbol of this group	2924/01038	. .	Strontium [Sr]	2924/01039	. .	Yttrium [Y]
2924/00012	. .	Relevant to the scope of the group, the symbol of which is combined with the symbol of this group	2924/0104	. .	Zirconium [Zr]	2924/01041	. .	Niobium [Nb]
2924/00013	. .	Fully indexed content	2924/01042	. .	Molybdenum [Mo]	2924/01043	. .	Technetium [Tc]
2924/00014	. .	the subject-matter covered by the group, the symbol of which is combined with the symbol of this group, being disclosed without further technical details	2924/01044	. .	Ruthenium [Ru]	2924/01045	. .	Rhodium [Rh]
2924/00015	. .	the subject-matter covered by the group, the symbol of which is combined with the symbol of this group, being disclosed as prior art	2924/01046	. .	Palladium [Pd]	2924/01047	. .	Silver [Ag]
2924/0002	. .	Not covered by any one of groups H01L 24/00 , H01L 24/00 and H01L 2224/00	2924/01048	. .	Cadmium [Cd]	2924/01049	. .	Indium [In]
2924/01	. .	Chemical elements	2924/0105	. .	Tin [Sn]	2924/01051	. .	Antimony [Sb]
2924/01001	. .	Hydrogen [H]	2924/01052	. .	Tellurium [Te]	2924/01053	. .	Iodine [I]
2924/01002	. .	Helium [He]	2924/01054	. .	Xenon [Xe]	2924/01055	. .	Cesium [Cs]
2924/01003	. .	Lithium [Li]	2924/01056	. .	Barium [Ba]	2924/01057	. .	Lanthanum [La]
2924/01004	. .	Beryllium [Be]	2924/01058	. .	Cerium [Ce]	2924/01059	. .	Praseodymium [Pr]
2924/01005	. .	Boron [B]	2924/0106	. .	Neodymium [Nd]	2924/01061	. .	Promethium [Pm]
2924/01006	. .	Carbon [C]	2924/01062	. .	Samarium [Sm]	2924/01063	. .	Europium [Eu]
2924/01007	. .	Nitrogen [N]	2924/01064	. .	Gadolinium [Gd]	2924/01065	. .	Terbium [Tb]
2924/01008	. .	Oxygen [O]	2924/01066	. .	Dysprosium [Dy]	2924/01067	. .	Holmium [Ho]
2924/01009	. .	Fluorine [F]	2924/01068	. .	Erbium [Er]	2924/01069	. .	Thulium [Tm]
2924/0101	. .	Neon [Ne]	2924/0107	. .	Ytterbium [Yb]	2924/01071	. .	Lutetium [Lu]
2924/01011	. .	Sodium [Na]	2924/01072	. .	Hafnium [Hf]	2924/01073	. .	Tantalum [Ta]
2924/01012	. .	Magnesium [Mg]	2924/01074	. .	Tungsten [W]	2924/01075	. .	Rhenium [Re]
2924/01013	. .	Aluminum [Al]	2924/01076	. .	Osmium [Os]	2924/01077	. .	Iridium [Ir]
2924/01014	. .	Silicon [Si]	2924/01078	. .	Platinum [Pt]	2924/01079	. .	Gold [Au]
2924/01015	. .	Phosphorus [P]	2924/0108	. .	Mercury [Hg]	2924/01081	. .	Thallium [Tl]
2924/01016	. .	Sulfur [S]	2924/01082	. .	Lead [Pb]	2924/01083	. .	Bismuth [Bi]
2924/01017	. .	Chlorine [Cl]	2924/01084	. .	Polonium [Po]			
2924/01018	. .	Argon [Ar]						
2924/01019	. .	Potassium [K]						
2924/0102	. .	Calcium [Ca]						
2924/01021	. .	Scandium [Sc]						
2924/01022	. .	Titanium [Ti]						
2924/01023	. .	Vanadium [V]						

2924/01085	. . Astatine [At]	2924/0421	. . 1st Group
2924/01086	. . Radon [Rn]	2924/0422	. . 2nd Group
2924/01087	. . Francium [Fr]	2924/0423	. . 3rd Group
2924/01088	. . Radium [Ra]	2924/0424	. . 4th Group
2924/01089	. . Actinium [Ac]	2924/0425	. . 5th Group
2924/0109	. . Thorium [Th]	2924/0426	. . 6th Group
2924/01091	. . Protactinium [Pa]	2924/0427	. . 7th Group
2924/01092	. . Uranium [U]	2924/0428	. . 8th Group
2924/01093	. . Neptunium [Np]	2924/0429	. . 9th Group
2924/01094	. . Plutonium [Pu]	2924/044	. . 10th Group
2924/011	. Groups of the periodic table	2924/0441	. . 11th Group
2924/01101	. . Alkali metals	2924/0442	. . 12th Group
2924/01102	. . Alkali earth metals	2924/0443	. . 13th Group
2924/01103	. . Transition metals	2924/0444	. . 14th Group
2924/01104	. . Refractory metals	2924/0445	. . Lanthanides
2924/01105	. . Rare earth metals	2924/0446	. . Actinides
2924/01106	. . . Lanthanides, i.e. Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu	2924/0449	. . being a combination of two or more materials provided in the groups H01L 2924/0421 - H01L 2924/0446
2924/01107	. . . Actinides, i.e. Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr	2924/04491	. . having a monocrystalline microstructure
2924/01108	. . Noble metals	2924/04492	. . having a polycrystalline microstructure
2924/01109	. . Metalloids or Semi-metals	2924/04494	. . having an amorphous microstructure, i.e. glass
2924/0111	. . Chalcogens	2924/045	. Carbides composed of metals from groups of the periodic table
2924/01111	. . Halogens	2924/0451	. . 1st Group
2924/01112	. . Noble gases	2924/0452	. . 2nd Group
2924/012	. Semiconductor purity grades	2924/0453	. . 3rd Group
2924/01201	. . 1N purity grades, i.e. 90%	2924/0454	. . 4th Group
2924/01202	. . 2N purity grades, i.e. 99%	2924/04541	. . . TiC
2924/01203	. . 3N purity grades, i.e. 99.9%	2924/0455	. . 5th Group
2924/01204	. . 4N purity grades, i.e. 99.99%	2924/0456	. . 6th Group
2924/01205	. . 5N purity grades, i.e. 99.999%	2924/04563	. . . WC
2924/01206	. . 6N purity grades, i.e. 99.9999%	2924/0457	. . 7th Group
2924/01207	. . 7N purity grades, i.e. 99.99999%	2924/0458	. . 8th Group
2924/01208	. . 8N purity grades, i.e. 99.999999%	2924/0459	. . 9th Group
2924/013	. Alloys	2924/046	. . 10th Group
2924/0132	. . Binary Alloys	2924/0461	. . 11th Group
2924/01321	. . . Isomorphous Alloys	2924/0462	. . 12th Group
2924/01322	. . . Eutectic Alloys, i.e. obtained by a liquid transforming into two solid phases	2924/0463	. . 13th Group
2924/01323	. . . Hypoeutectic alloys i.e. with compositions lying to the left of the eutectic point	2924/0464	. . 14th Group
2924/01324	. . . Hypereutectic alloys i.e. with compositions lying to the right of the eutectic point	2924/04642	. . . SiC
2924/01325	. . . Peritectic Alloys, i.e. obtained by a liquid and a solid transforming into a new and different solid phase	2924/0465	. . Lanthanides
2924/01326	. . . Monotectics, i.e. obtained by a liquid transforming into a solid and a new and different liquid phase	2924/0466	. . Actinides
2924/01327	. . . Intermediate phases, i.e. intermetallics compounds	2924/0469	. . being a combination of two or more materials provided in the groups H01L 2924/0451 - H01L 2924/0466
2924/0133	. . Ternary Alloys	2924/04691	. . having a monocrystalline microstructure
2924/0134	. . Quaternary Alloys	2924/04692	. . having a polycrystalline microstructure
2924/0135	. . Quinary Alloys	2924/04694	. . having an amorphous microstructure, i.e. glass
2924/014	. . Solder alloys	2924/047	. Silicides composed of metals from groups of the periodic table
2924/01402	. . Invar, i.e. single-phase alloy of around 36% nickel and 64% iron	2924/0471	. . 1st Group
2924/01403	. . Kovar, i.e. FeNiCo alloys	2924/0472	. . 2nd Group
2924/01404	. . Alloy 42, i.e. FeNi42	2924/0473	. . 3rd Group
2924/01405	. . Inovco, i.e. Fe-33Ni-4.5Co	2924/0474	. . 4th Group
2924/042	. Borides composed of metals from groups of the periodic table	2924/0475	. . 5th Group
		2924/0476	. . 6th Group
		2924/0477	. . 7th Group
		2924/0478	. . 8th Group
		2924/0479	. . 9th Group
		2924/048	. . 10th Group
		2924/0481	. . 11th Group

2924/0482	. . 12th Group	2924/05294	. . having an amorphous microstructure, i.e. glass
2924/0483	. . 13th Group	2924/053	. Oxides composed of metals from groups of the periodic table
2924/0484	. . 14th Group	2924/0531	. . 1st Group
2924/0485	. . Lanthanides	2924/0532	. . 2nd Group
2924/0486	. . Actinides	2924/0533	. . 3rd Group
2924/0489	. . being a combination of two or more materials provided in the groups H01L 2924/0471 - H01L 2924/0486	2924/0534	. . 4th Group
2924/04891	. . having a monocrystalline microstructure	2924/05341	. . . TiO ₂
2924/04892	. . having a polycrystalline microstructure	2924/05342	. . . ZrO ₂
2924/04894	. . having an amorphous microstructure, i.e. glass	2924/0535	. . 5th Group
2924/049	. Nitrides composed of metals from groups of the periodic table	2924/0536	. . 6th Group
2924/0491	. . 1st Group	2924/0537	. . 7th Group
2924/0492	. . 2nd Group	2924/0538	. . 8th Group
2924/0493	. . 3rd Group	2924/05381	. . . FeOx
2924/0494	. . 4th Group	2924/0539	. . 9th Group
2924/04941	. . . TiN	2924/054	. . 10th Group
2924/0495	. . 5th Group	2924/0541	. . 11th Group
2924/04953	. . . TaN	2924/0542	. . 12th Group
2924/0496	. . 6th Group	2924/0543	. . 13th Group
2924/0497	. . 7th Group	2924/05432	. . . Al ₂ O ₃
2924/0498	. . 8th Group	2924/0544	. . 14th Group
2924/0499	. . 9th Group	2924/05442	. . . SiO ₂
2924/05	. . 10th Group	2924/0545	. . Lanthanides
2924/0501	. . 11th Group	2924/0546	. . Actinides
2924/0502	. . 12th Group	2924/0549	. . being a combination of two or more materials provided in the groups H01L 2924/0531 - H01L 2924/0546
2924/0503	. . 13th Group	2924/05491	. . having a monocrystalline microstructure
2924/05032	. . . AlN	2924/05492	. . having a polycrystalline microstructure
2924/0504	. . 14th Group	2924/05494	. . having an amorphous microstructure, i.e. glass
2924/05042	. . . Si ₃ N ₄	2924/055	. Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table
2924/0505	. . Lanthanides	2924/0551	. . 1st Group
2924/0506	. . Actinides	2924/0552	. . 2nd Group
2924/0509	. . being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506	2924/0553	. . 3rd Group
2924/05091	. . having a monocrystalline microstructure	2924/0554	. . 4th Group
2924/05092	. . having a polycrystalline microstructure	2924/0555	. . 5th Group
2924/05094	. . having an amorphous microstructure, i.e. glass	2924/0556	. . 6th Group
2924/051	. Phosphides composed of metals from groups of the periodic table	2924/0557	. . 7th Group
2924/0511	. . 1st Group	2924/0558	. . 8th Group
2924/0512	. . 2nd Group	2924/0559	. . 9th Group
2924/0513	. . 3rd Group	2924/056	. . 10th Group
2924/0514	. . 4th Group	2924/0561	. . 11th Group
2924/0515	. . 5th Group	2924/0562	. . 12th Group
2924/0516	. . 6th Group	2924/0563	. . 13th Group
2924/0517	. . 7th Group	2924/0564	. . 14th Group
2924/0518	. . 8th Group	2924/0565	. . Lanthanides
2924/0519	. . 9th Group	2924/0566	. . Actinides
2924/052	. . 10th Group	2924/0569	. . being a combination of two or more materials provided in the groups H01L 2924/0551 - H01L 2924/0566
2924/0521	. . 11th Group	2924/05691	. . having a monocrystalline microstructure
2924/0522	. . 12th Group	2924/05692	. . having a polycrystalline microstructure
2924/0523	. . 13th Group	2924/05694	. . having an amorphous microstructure, i.e. glass
2924/0524	. . 14th Group	2924/057	. Halides composed of metals from groups of the periodic table
2924/0525	. . Lanthanides	2924/0571	. . 1st Group
2924/0526	. . Actinides	2924/0572	. . 2nd Group
2924/0529	. . being a combination of two or more materials provided in the groups H01L 2924/0511 - H01L 2924/0526	2924/0573	. . 3rd Group
2924/05291	. . having a monocrystalline microstructure	2924/0574	. . 4th Group
2924/05292	. . having a polycrystalline microstructure	2924/0575	. . 5th Group

2924/0576	. . 6th Group	2924/096	. . Cermets, i.e. composite material composed of ceramic and metallic materials
2924/0577	. . 7th Group	2924/097	. . Glass-ceramics, e.g. devitrified glass
2924/0578	. . 8th Group	2924/09701	. . . Low temperature co-fired ceramic [LTCC]
2924/0579	. . 9th Group	2924/10	. Details of semiconductor or other solid state devices to be connected
2924/058	. . 10th Group	2924/1011	. . Structure
2924/0581	. . 11th Group	2924/1015	. . Shape
2924/0582	. . 12th Group	2924/10155	. . . being other than a cuboid
2924/0583	. . 13th Group	2924/10156	 at the periphery
2924/0584	. . 14th Group	2924/10157	 at the active surface
2924/0585	. . Lanthanides	2924/10158	 at the passive surface
2924/0586	. . Actinides	2924/1016	. . . being a cuboid
2924/0589	. . being a combination of two or more materials provided in the groups H01L 2924/0571 - H01L 2924/0586	2924/10161	 with a rectangular active surface
2924/05891	. . having a monocrystalline microstructure	2924/10162	 with a square active surface
2924/05892	. . having a polycrystalline microstructure	2924/1017	. . . being a sphere
2924/05894	. . having an amorphous microstructure, i.e. glass	2924/102	. . Material of the semiconductor or solid state bodies
2924/059	. Being combinations of any of the materials from the groups H01L 2924/042 - H01L 2924/0584 , e.g. oxynitrides	2924/1025	. . . Semiconducting materials
2924/05991	. . having a monocrystalline microstructure	2924/10251	 Elemental semiconductors, i.e. Group IV
2924/05992	. . having a polycrystalline microstructure	2924/10252	 Germanium [Ge]
2924/05994	. . having an amorphous microstructure, i.e. glass	2924/10253	 Silicon [Si]
2924/06	. Polymers	2924/10254	 Diamond [C]
2924/061	. . Polyolefin polymer	2924/1026	 Compound semiconductors
2924/0615	. . Styrenic polymer	2924/1027	 IV
2924/062	. . Halogenated polymer	2924/10271	 Silicon-germanium [SiGe]
2924/0625	. . Polyvinyl alcohol	2924/10272	 Silicon Carbide [SiC]
2924/063	. . Polyvinyl acetate	2924/1032	 III-V
2924/0635	. . Acrylic polymer	2924/10321	 Aluminium antimonide [AlSb]
2924/064	. . Graft polymer	2924/10322	 Aluminium arsenide [AlAs]
2924/0645	. . Block copolymer	2924/10323	 Aluminium nitride [AlN]
2924/065	. . ABS	2924/10324	 Aluminium phosphide [AlP]
2924/0655	. . Polyacetal	2924/10325	 Boron nitride [BN], e.g. cubic, hexagonal, nanotube
2924/066	. . Phenolic resin	2924/10326	 Boron phosphide [BP]
2924/0665	. . Epoxy resin	2924/10327	 Boron arsenide [BAs, B ₁₂ As ₂]
2924/067	. . Polyphenylene	2924/10328	 Gallium antimonide [GaSb]
2924/0675	. . Polyester	2924/10329	 Gallium arsenide [GaAs]
2924/068	. . Polycarbonate	2924/1033	 Gallium nitride [GaN]
2924/0685	. . Polyether	2924/10331	 Gallium phosphide [GaP]
2924/069	. . Polyurethane	2924/10332	 Indium antimonide [InSb]
2924/0695	. . Polyamide	2924/10333	 Indium arsenide [InAs]
2924/07	. . Polyamine or polyimide	2924/10334	 Indium nitride [InN]
2924/07001	. . . Polyamine	2924/10335	 Indium phosphide [InP]
2924/07025	. . . Polyimide	2924/10336	 Aluminium gallium arsenide [AlGaAs]
2924/0705	. . Sulfur containing polymer	2924/10337	 Indium gallium arsenide [InGaAs]
2924/0715	. . Polysiloxane	2924/10338	 Indium gallium phosphide [InGaP]
2924/078	. . Adhesive characteristics other than chemical	2924/10339	 Aluminium indium arsenide [AlInAs]
2924/07802	. . . not being an ohmic electrical conductor	2924/1034	 Aluminium indium antimonide [AlInSb]
2924/0781	. . . being an ohmic electrical conductor	2924/10341	 Gallium arsenide nitride [GaAsN]
2924/07811	 Extrinsic, i.e. with electrical conductive fillers	2924/10342	 Gallium arsenide phosphide [GaAsP]
2924/07812	 Intrinsic, e.g. polyaniline [PANI]	2924/10343	 Gallium arsenide antimonide [GaAsSb]
2924/0782	. . . being pressure sensitive	2924/10344	 Aluminium gallium nitride [AlGaN]
2924/095	. with a principal constituent of the material being a combination of two or more materials provided in the groups H01L 2924/013 - H01L 2924/0715	2924/10345	 Aluminium gallium phosphide [AlGaP]
2924/0951	. . Glass epoxy laminates	2924/10346	 Indium gallium nitride [InGaN]
2924/09511	. . . FR-4	2924/10347	 Indium arsenide antimonide [InAsSb]
2924/09512	. . . FR-5	2924/10348	 Indium gallium antimonide [InGaSb]
2924/09522	. . . G10	2924/10349	 Aluminium gallium indium phosphide [AlGaInP]
2924/09523	. . . G11	2924/1035	 Aluminium gallium arsenide phosphide [AlGaInP]

2924/10351		Indium gallium arsenide phosphide [InGaAsP]	2924/10676		Bismuth trioxide [Bi ₂ O ₃]
2924/10352		Indium gallium arsenide antimonide [InGaAsSb]	2924/10677		Tin dioxide [SnO ₂]
2924/10353		Indium arsenide antimonide phosphide [InAsSbP]	2924/10678		Barium titanate [BaTiO ₃]
2924/10354		Aluminium indium arsenide phosphide [AlInAsP]	2924/10679		Strontium titanate [SrTiO ₃]
2924/10355		Aluminium gallium arsenide nitride [AlGaAsN]	2924/1068		Lithium niobate [LiNbO ₃]
2924/10356		Indium gallium arsenide nitride [InGaAsN]	2924/10681		Lanthanum copper oxide [La ₂ CuO ₄]
2924/10357		Indium aluminium arsenide nitride [InAlAsN]	2924/1072		Layered
2924/10358		Gallium arsenide antimonide nitride [GaAsSbN]	2924/10721		Lead(II)iodide [PbI ₂]
2924/10359		Gallium indium nitride arsenide antimonide [GaInNAsSb]	2924/10722		Molybdenum disulfide [MoS ₂]
2924/1036		Gallium indium arsenide antimonide phosphide [GaInAsSbP]	2924/10723		Gallium selenide [GaSe]
2924/1037		II-VI	2924/10724		Tin sulfide [SnS]
2924/10371		Cadmium selenide [CdSe]	2924/10725		Bismuth sulfide [Bi ₂ S ₃]
2924/10372		Cadmium sulfide [CdS]	2924/1077		Magnetic diluted [DMS]
2924/10373		Cadmium telluride [CdTe]	2924/10771		Gallium manganese arsenide [GaMnAs]
2924/10375		Zinc selenide [ZnSe]	2924/10772		Indium manganese arsenide [InMnAs]
2924/10376		Zinc sulfide [ZnS]	2924/10773		Cadmium manganese telluride [CdMnTe]
2924/10377		Zinc telluride [ZnTe]	2924/10774		Lead manganese telluride [PbMnTe]
2924/10378		Cadmium zinc telluride, i.e. CZT [CdZnTe]	2924/10775		Lanthanum calcium manganate [La _{0.7} Ca _{0.3} MnO ₃]
2924/10379		Mercury cadmium telluride [HgZnTe]	2924/10776		Iron(II)oxide [FeO]
2924/1038		Mercury zinc telluride [HgZnSe]	2924/10777		Nickel(II)oxide [NiO]
2924/10381		Mercury zinc selenide [HgZnSe]	2924/10778		Europium(II)oxide [EuO]
2924/1042		I-VII	2924/10779		Europium(II)sulfide [EuS]
2924/10421		Cuprous chloride [CuCl]	2924/1078		Chromium(III)bromide [CrBr ₃]
2924/1047		I-VI	2924/1082		Other
2924/10471		Copper sulfide [CuS]	2924/10821		Copper indium gallium selenide, CIGS [CuInGaSe ₂]
2924/1052		IV-VI	2924/10822		Copper zinc tin sulfide, CZTS [Cu ₂ ZnSnS ₄]
2924/10521		Lead selenide [PbSe]	2924/10823		Copper indium selenide, CIS [CuInSe ₂]
2924/10522		Lead(II)sulfide [PbS]	2924/10824		Silver gallium sulfide [AgGaS ₂]
2924/10523		Lead telluride [PbTe]	2924/10825		Zinc silicon phosphide [ZnSiP ₂]
2924/10524		Tin sulfide [SnS, SnS ₂]	2924/10826		Arsenic selenide [As ₂ S ₃]
2924/10525		Tin telluride [SnTe]	2924/10827		Platinum silicide [PtSi]
2924/10526		Lead tin telluride [PbSnTe]	2924/10828		Bismuth(III)iodide [BiI ₃]
2924/10527		Thallium tin telluride [Tl ₂ SnTe ₅]	2924/10829		Mercury(II)iodide [HgI ₂]
2924/10528		Thallium germanium telluride [Tl ₂ GeTe ₅]	2924/1083		Thallium(I)bromide [TlBr]
2924/1057		V-VI	2924/10831		Selenium [Se]
2924/10571		Bismuth telluride [Bi ₂ Te ₃]	2924/10832		Silver sulfide [Ag ₂ S]
2924/1062		II-V	2924/10833		Iron disulfide [FeS ₂]
2924/10621		Cadmium phosphide [Cd ₃ P ₂]	2924/11		Device type
2924/10622		Cadmium arsenide [Cd ₃ As ₂]	2924/12		Passive devices, e.g. 2 terminal devices
2924/10623		Cadmium antimonide [Cd ₃ Sb ₂]	2924/1203		Rectifying Diode
2924/10624		Zinc phosphide [Zn ₃ P ₂]	2924/12031		PIN diode
2924/10625		Zinc arsenide [Zn ₃ As ₂]	2924/12032		Schottky diode
2924/10626		Zinc antimonide [Zn ₃ Sb ₂]	2924/12033		Gunn diode
2924/1067		Oxide	2924/12034		Varactor
2924/10671		Titanium dioxide, anatase, rutile, brookite [TiO ₂]	2924/12035		Zener diode
2924/10672		Copper(I)oxide [Cu ₂ O]	2924/12036		PN diode
2924/10673		Copper(II)oxide [CuO]	2924/12037		Cat's whisker diode
2924/10674		Uranium dioxide [UO ₂]	2924/12038		Point contact
2924/10675		Uranium trioxide [UO ₃]	2924/1204		Optical Diode
			2924/12041		LED
			2924/12042		LASER
			2924/12043		Photo diode
			2924/12044		OLED
			2924/1205		Capacitor
			2924/1206		Inductor
			2924/1207		Resistor
			2924/13		Discrete devices, e.g. 3 terminal devices
			2924/1301		Thyristor

2924/13011		Anode Gate Thyristor [AGT]	2924/13067		FinFET, source/drain region shapes fins on the silicon surface
2924/13013		Bidirectional Control Thyristor [BCT]	2924/13068		Fast-reverse epitaxial diode field-effect transistor [FREDFET]
2924/13014		Breakover Diode [BOD]	2924/13069		Thin film transistor [TFT]
2924/13015		DIAC - Bidirectional trigger device	2924/1307		Organic Field-Effect Transistor [OFET]
2924/13016		Dynistor - Unidirectional switching device	2924/13071		Ballistic transistor
2924/13017		Shockley diode - Unidirectional trigger and switching device	2924/13072		Sensor FET
2924/13018		SIDAC - Bidirectional switching device	2924/13073		ion-sensitive field-effect transistor [ISFET]
2924/13019		Trisil, SIDACtor - Bidirectional protection devices	2924/13074		Electrolyte-oxide-semiconductor field effect transistor [EOSFET], e.g. Neurochip
2924/1302		GTO - Gate Turn-Off thyristor	2924/13075		Deoxyribonucleic acid field-effect transistor [DNAFET]
2924/13021		DB-GTO - Distributed Buffer Gate Turn-Off thyristor	2924/13076		DEPFET
2924/13022		MA-GTO - Modified Anode Gate Turn-Off thyristor	2924/13078		Unijunction transistors
2924/13023		IGCT - Integrated Gate Commutated Thyristor	2924/13079		Single-electron transistors [SET]
2924/13024		LASCR - Light Activated SCR, or LTT - Light triggered thyristor	2924/1308		Nanofluidic transistor
2924/13025		Light Activated Semiconducting Switch [LASS]	2924/13081		Multigate devices
2924/13026		MCT - MOSFET Controlled Thyristor - It contains two additional FET structures for on/off control	2924/13082		Tetrode transistor
2924/13027		BRT - Base Resistance Controlled Thyristor	2924/13083		Pentode transistor
2924/13028		RCT - Reverse Conducting Thyristor	2924/13084		Trigate transistor
2924/13029		PUT or PUJT - Programmable Unijunction Transistor - A thyristor with gate on n-type layer near to the anode used as a functional replacement for unijunction transistor	2924/13085		Dual gate FETs
2924/1303		SCS - Silicon Controlled Switch or Thyristor Tetrode - A thyristor with both cathode and anode gates	2924/13086		Junctionless Nanowire Transistor [JNT]
2924/13032		SITh - Static Induction Thyristor, or FCTh - Field Controlled Thyristor - containing a gate structure that can shut down anode current flow	2924/13087		Vertical-Slit Field-Effect Transistor [VeSFET]
2924/13033		TRIAC - Triode for Alternating Current - A bidirectional switching device containing two thyristor structures with common gate contact	2924/13088		Graphene Nanoribbon Field-Effect Transistor [GNRFET]
2924/13034		Silicon Controlled Rectifier [SCR]	2924/13089		Nanoparticle Organic Memory Field-Effect Transistor [NOMFET]
2924/13035		Asymmetrical SCR [ASCR]	2924/1309		Modulation-Doped Field Effect Transistor [MODFET]
2924/1304		Transistor	2924/13091		Metal-Oxide-Semiconductor Field-Effect Transistor [MOSFET]
2924/1305		Bipolar Junction Transistor [BJT]	2924/13092		Dual Gate Metal-Oxide-Semiconductor Field-Effect Transistor [DGMOSFET]
2924/13051		Heterojunction bipolar transistor [HBT]	2924/14		Integrated circuits
2924/13052		Schottky transistor	2924/141		Analog devices
2924/13053		Avalanche transistor	2924/142		HF devices
2924/13054		Darlington transistor	2924/1421		RF devices
2924/13055		Insulated gate bipolar transistor [IGBT]	2924/14211		Voltage-controlled oscillator [VCO]
2924/13056		Photo transistor	2924/14215		Low-noise amplifier [LNA]
2924/1306		Field-effect transistor [FET]	2924/1422		Mixer
2924/13061		Carbon nanotube field-effect transistor [CNFET]	2924/14221		Electronic mixer
2924/13062		Junction field-effect transistor [JFET]	2924/14222		Frequency mixer
2924/13063		Metal-Semiconductor Field-Effect Transistor [MESFET]	2924/1423		Monolithic Microwave Integrated Circuit [MMIC]
2924/13064		High Electron Mobility Transistor [HEMT, HFET [heterostructure FET], MODFET]	2924/1424		Operational amplifier
2924/13066		Inverted-T field effect transistor [ITFET]	2924/1425		Converter
			2924/14251		Frequency converter
			2924/14252		Voltage converter
			2924/14253		Digital-to-analog converter [DAC]
			2924/1426		Driver
			2924/1427		Voltage regulator [VR]
			2924/143		Digital devices
			2924/1431		Logic devices
			2924/1432		Central processing unit [CPU]
			2924/1433		Application-specific integrated circuit [ASIC]
			2924/14335		Digital signal processor [DSP]
			2924/1434		Memory

2924/1435	 Random access memory [RAM]	2924/153	. . . Connection portion
2924/1436	 Dynamic random-access memory [DRAM]	2924/1531	 the connection portion being formed only on the surface of the substrate opposite to the die mounting surface
2924/14361	 Synchronous dynamic random access memory [SDRAM]	2924/15311	 being a ball array, e.g. BGA
2924/14362	 RAS Only Refresh [ROR]	2924/15312	 being a pin array, e.g. PGA
2924/14363	 CAS before RAS refresh [CBR]	2924/15313	 being a land array, e.g. LGA
2924/14364	 Multibank DRAM [MDRAM]	2924/1532	 the connection portion being formed on the die mounting surface of the substrate
2924/14365	 Video DRAM [VRAM]	2924/15321	 being a ball array, e.g. BGA
2924/14366	 Window DRAM [WRAM]	2924/15322	 being a pin array, e.g. PGA
2924/14367	 Fast page mode DRAM [FPM DRAM]	2924/15323	 being a land array, e.g. LGA
2924/14368	 Extended data out DRAM [EDO DRAM]	2924/1533	 the connection portion being formed both on the die mounting surface of the substrate and outside the die mounting surface of the substrate
2924/14369	 Burst EDO DRAM [BEDO DRAM]	2924/15331	 being a ball array, e.g. BGA
2924/1437	 Static random-access memory [SRAM]	2924/15332	 being a pin array, e.g. PGA
2924/1438	 Flash memory	2924/15333	 being a land array, e.g. LGA
2924/1441	 Ferroelectric RAM [FeRAM or FRAM]	2924/156	. . . Material
2924/1442	 Synchronous graphics RAM [SGRAM]	2924/157	 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/1443	 Non-volatile random-access memory [NVRAM]	2924/15701	 the principal constituent melting at a temperature of less than 400 C
2924/1444	 PBRAM	2924/15717	 the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
2924/145	 Read-only memory [ROM]	2924/15724	 Aluminium [Al] as principal constituent
2924/1451	 EPROM	2924/15738	 the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
2924/14511	 EEPROM	2924/15747	 Copper [Cu] as principal constituent
2924/1453	 PROM	2924/1576	 Iron [Fe] as principal constituent
2924/146	. . Mixed devices	2924/15763	 the principal constituent melting at a temperature of greater than 1550 C
2924/1461	. . . MEMS	2924/15786	 with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/15	. Details of package parts other than the semiconductor or other solid state devices to be connected	2924/15787	 Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/151	. . Die mounting substrate	2924/15788	 Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1511	. . . Structure	2924/1579	 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/1515	. . . Shape	2924/15791	 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2924/15151	 the die mounting substrate comprising an aperture, e.g. for underfilling, outgassing, window type wire connections	2924/15793	 with a principal constituent of the material being a solid not provided for in groups H01L 2924/157 - H01L 2924/15791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/15153	 the die mounting substrate comprising a recess for hosting the device	2924/15798	 with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/15155	 the shape of the recess being other than a cuboid	2924/161	. . Cap
2924/15156	 Side view	2924/1611	. . . Structure
2924/15157	 Top view	2924/1615	. . . Shape
2924/15158	 the die mounting substrate being other than a cuboid		
2924/15159	 Side view		
2924/15162	 Top view		
2924/15165	. . . Monolayer substrate		
2924/1517	. . . Multilayer substrate		
2924/15172	 Fan-out arrangement of the internal vias		
2924/15173	 in a single layer of the multilayer substrate		
2924/15174	 in different layers of the multilayer substrate		
2924/15182	 Fan-in arrangement of the internal vias		
2924/15183	 in a single layer of the multilayer substrate		
2924/15184	 in different layers of the multilayer substrate		
2924/15192	 Resurf arrangement of the internal vias		
2924/152	. . . Disposition		

2924/16151		Cap comprising an aperture, e.g. for pressure control, encapsulation	2924/16586		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/16152		Cap comprising a cavity for hosting the device, e.g. U-shaped cap	2924/16587		Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/16153		Cap enclosing a plurality of side-by-side cavities [e.g. E-shaped cap]	2924/16588		Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1616		Cavity shape	2924/1659		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/1617		Cavity coating	2924/16593		with a principal constituent of the material being a solid not provided for in groups H01L 2924/157 - H01L 2924/15791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/16171		Material	2924/16598		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/16172		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2924/166	. . .	Material
2924/16173		with a principal constituent of the material being a non metallic, non metalloid inorganic material	2924/167		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/16174		Ceramics, e.g. crystalline carbides, nitrides or oxides	2924/16701		the principal constituent melting at a temperature of less than 400 C
2924/16175		Glasses, e.g. amorphous oxides, nitrides or fluorides	2924/16717		the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
2924/16176		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2924/16724		Aluminium [Al] as principal constituent
2924/16177		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2924/16738		the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
2924/16178		with a principal constituent of the material being a solid not provided for in groups H01L 2924/157 - H01L 2924/15791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2924/16747		Copper [Cu] as principal constituent
2924/16179		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2924/1676		Iron [Fe] as principal constituent
2924/1619		Cavity coating shape	2924/16763		the principal constituent melting at a temperature of greater than 1550 C
2924/16195		Flat cap [not enclosing an internal cavity]	2924/16786		with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/16196		Cap forming a cavity, e.g. being a curved metal foil	2924/16787		Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/162	. . .	Disposition	2924/16788		Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/16235		Connecting to a semiconductor or solid-state bodies, i.e. cap-to-chip	2924/1679		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/16251		Connecting to an item not being a semiconductor or solid-state body, e.g. cap-to-substrate	2924/16791		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2924/1626		Cap-in-cap assemblies	2924/16793		with a principal constituent of the material being a solid not provided for in groups H01L 2924/167 - H01L 2924/16791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/1627		stacked type assemblies, e.g. stacked multi-cavities	2924/16798		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/163	. . .	Connection portion, e.g. seal	2924/171	. . .	Frame
2924/1631		Structure	2924/1711	. . .	Structure
2924/16315		Shape	2924/1715	. . .	Shape
2924/1632		Disposition			
2924/164		Material			
2924/165		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof			

2924/17151		Frame comprising an aperture, e.g. for pressure control, encapsulation	2924/19011	. . .	including integrated passive components
2924/172	. . .	Disposition	2924/19015	. . .	including thin film passive components
2924/173	. . .	Connection portion, e.g. seal	2924/1902	. . .	including thick film passive components
2924/176	. . .	Material	2924/1903	. . .	including wave guides
2924/177		with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2924/19031		being a strip line type
2924/17701		the principal constituent melting at a temperature of less than 400 C	2924/19032		being a microstrip line type
2924/17717		the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C	2924/19033		being a coplanar line type
2924/17724		Aluminium [Al] as principal constituent	2924/19038		being a hybrid line type
2924/17738		the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C	2924/19039		impedance transition between different types of wave guides
2924/17747		Copper [Cu] as principal constituent	2924/1904	. . .	Component type
2924/1776		Iron [Fe] as principal constituent	2924/19041		being a capacitor
2924/17763		the principal constituent melting at a temperature of greater than 1550 C	2924/19042		being an inductor
2924/17786		with a principal constituent of the material being a non metallic, non metalloid inorganic material	2924/19043		being a resistor
2924/17787		Ceramics, e.g. crystalline carbides, nitrides or oxides	2924/1905	. .	Shape
2924/17788		Glasses, e.g. amorphous oxides, nitrides or fluorides	2924/19051	. . .	Impedance matching structure [e.g. balun]
2924/1779		with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2924/191	. .	Disposition
2924/17791		The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2924/19101	. . .	of discrete passive components
2924/17793		with a principal constituent of the material being a solid not provided for in groups H01L 2924/177 - H01L 2924/17791 , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2924/19102		in a stacked assembly with the semiconductor or solid state device
2924/17798		with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2924/19103		interposed between the semiconductor or solid-state device and the die mounting substrate, i.e. chip-on-passive
2924/181	. .	Encapsulation	2924/19104		on the semiconductor or solid-state device, i.e. passive-on-chip
2924/1811	. . .	Structure	2924/19105		in a side-by-side arrangement on a common die mounting substrate
2924/1815	. . .	Shape	2924/19106		in a mirrored arrangement on two different side of a common die mounting substrate
2924/1816		Exposing the passive side of the semiconductor or solid-state body	2924/19107		off-chip wires
2924/18161		of a flip chip	2924/20	. .	Parameters
2924/18162		of a chip with build-up interconnect	2924/201	. .	Temperature ranges
2924/18165		of a wire bonded chip	2924/20101	. . .	Temperature range $T < 0\text{ C}$, $T < 273.15\text{ K}$
2924/182	. . .	Disposition	2924/20102	. . .	Temperature range $0\text{ C} = < T < 60\text{ C}$, $273.15\text{ K} = < T < 333.15\text{ K}$
2924/183	. . .	Connection portion, e.g. seal	2924/20103	. . .	Temperature range $60\text{ C} = < T < 100\text{ C}$, $333.15\text{ K} = < T < 373.15\text{ K}$
2924/18301		being an anchoring portion, i.e. mechanical interlocking between the encapsulation resin and another package part	2924/20104	. . .	Temperature range $100\text{ C} = < T < 150\text{ C}$, $373.15\text{ K} = < T < 423.15\text{ K}$
2924/186	. . .	Material	2924/20105	. . .	Temperature range $150\text{ C} = < T < 200\text{ C}$, $423.15\text{ K} = < T < 473.15\text{ K}$
2924/19	. .	Details of hybrid assemblies other than the semiconductor or other solid state devices to be connected	2924/20106	. . .	Temperature range $200\text{ C} = < T < 250\text{ C}$, $473.15\text{ K} = < T < 523.15\text{ K}$
2924/1901	. .	Structure	2924/20107	. . .	Temperature range $250\text{ C} = < T < 300\text{ C}$, $523.15\text{ K} = < T < 573.15\text{ K}$
			2924/20108	. . .	Temperature range $300\text{ C} = < T < 350\text{ C}$, $573.15\text{ K} = < T < 623.15\text{ K}$
			2924/20109	. . .	Temperature range $350\text{ C} = < T < 400\text{ C}$, $623.15\text{ K} = < T < 673.15\text{ K}$
			2924/2011	. . .	Temperature range $400\text{ C} = < T < 450\text{ C}$, $673.15\text{ K} = < T < 723.15\text{ K}$
			2924/20111	. . .	Temperature range $450\text{ C} = < T < 500\text{ C}$, $723.15\text{ K} = < T < 773.15\text{ K}$
			2924/202	. .	Electromagnetic wavelength ranges [W]
			2924/20201	. . .	Gamma radiation, i.e. wavelength less than 0.01 nm
			2924/20202	. . .	X-ray radiation, i.e. wavelength 0.01 to 10 nm
			2924/2021	. . .	Ultraviolet radiation
			2924/20211		UV-C $100 = < W < 280\text{ nm}$
			2924/20212		UV-B $280 = < W < 315\text{ nm}$
			2924/20213		UV-A $315 = < W < 400\text{ nm}$
			2924/2024	. . .	Visible spectrum wavelength $390 = < W < 700\text{ nm}$, i.e. 400-790 THz

2924/2026	. . . Infrared radiation 700= $\leq$ W<3000 nm	2924/2075	. . . larger or equal to 1 micron less than 10 microns
2924/20261	. . . IR-A 700= $\leq$ W<1400 nm, i.e. 215 THz-430 THz	2924/20751	. . . larger or equal to 10 microns less than 20 microns
2924/20262	. . . IR-B 1400= $\leq$ W<3000 nm, i.e. 100THz-215 THz	2924/20752	. . . larger or equal to 20 microns less than 30 microns
2924/20263	. . . IR-C 3000 nm = $\leq$ W<1 mm, i.e. 300 GHz-100THz	2924/20753	. . . larger or equal to 30 microns less than 40 microns
2924/2027	. . . Radio 1 mm - km 300 GHz - 3 Hz	2924/20754	. . . larger or equal to 40 microns less than 50 microns
2924/20271	. . . Microwave radiation 1 mm - 1 meter, i.e 300 GHz - 300 MHz	2924/20755	. . . larger or equal to 50 microns less than 60 microns
2924/203	. . Ultrasonic frequency ranges, i.e. KHz	2924/20756	. . . larger or equal to 60 microns less than 70 microns
2924/20301	. . . Ultrasonic frequency [f] f<25 kHz	2924/20757	. . . larger or equal to 70 microns less than 80 microns
2924/20302	. . . Ultrasonic frequency [f] 25 Khz= $\leq$ f< 50 KHz	2924/20758	. . . larger or equal to 80 microns less than 90 microns
2924/20303	. . . Ultrasonic frequency [f] 50 Khz= $\leq$ f< 75 KHz	2924/20759	. . . larger or equal to 90 microns less than 100 microns
2924/20304	. . . Ultrasonic frequency [f] 75 Khz= $\leq$ f< 100 KHz	2924/2076	. . . equal to or larger than 100 microns
2924/20305	. . . Ultrasonic frequency [f] 100 Khz= $\leq$ f< 125 KHz	2924/30	. Technical effects
2924/20306	. . . Ultrasonic frequency [f] 125 Khz= $\leq$ f< 150 KHz	2924/301	. . Electrical effects
2924/20307	. . . Ultrasonic frequency [f] 150 Khz= $\leq$ f< 175 KHz	2924/30101	. . . Resistance
2924/20308	. . . Ultrasonic frequency [f] 175 Khz= $\leq$ f< 200 KHz	2924/30105	. . . Capacitance
2924/20309	. . . Ultrasonic frequency [f] f $\geq$ 200 KHz	2924/30107	. . . Inductance
2924/206	. . Length ranges	2924/3011	. . . Impedance
2924/2064	. . . larger or equal to 1 micron less than 100 microns	2924/30111	 matching
2924/20641	. . . larger or equal to 100 microns less than 200 microns	2924/302	. . . Electrostatic
2924/20642	. . . larger or equal to 200 microns less than 300 microns	2924/30201	 Charge
2924/20643	. . . larger or equal to 300 microns less than 400 microns	2924/30205	 Discharge
2924/20644	. . . larger or equal to 400 microns less than 500 microns	2924/3025	. . . Electromagnetic shielding
2924/20645	. . . larger or equal to 500 microns less than 600 microns	2924/35	. . Mechanical effects
2924/20646	. . . larger or equal to 600 microns less than 700 microns	2924/351	. . . Thermal stress
2924/20647	. . . larger or equal to 700 microns less than 800 microns	2924/3511	 Warping
2924/20648	. . . larger or equal to 800 microns less than 900 microns	2924/3512	 Cracking
2924/20649	. . . larger or equal to 900 microns less than 1000 microns	2924/35121	 Peeling or delaminating
2924/2065	. . . larger or equal to 1000 microns less than 1500 microns	2924/36	. . Material effects
2924/20651	. . . larger or equal to 1500 microns less than 2000 microns	2924/364	. . . Polymers
2924/20652	. . . larger or equal to 2000 microns less than 2500 microns	2924/3641	 Outgassing
2924/20653	. . . larger or equal to 2500 microns less than 3000 microns	2924/365	. . . Metallurgical effects
2924/20654	. . . larger or equal to 3000 microns less than 4000 microns	2924/3651	 Formation of intermetallics
2924/20655	. . . larger or equal to 4000 microns less than 5000 microns	2924/36511	 Purple plague
2924/20656	. . . larger or equal to 5000 microns less than 6000 microns	2924/3656	 Formation of Kirkendall voids
2924/20657	. . . larger or equal to 6000 microns less than 7000 microns	2924/37	. . Effects of the manufacturing process
2924/20658	. . . larger or equal to 7000 microns less than 8000 microns	2924/37001	. . . Yield
2924/207	. . Diameter ranges	2924/37002	. . . Shelf life
		2924/3701	. . . increased through put
		2924/38	. . Effects and problems related to the device integration
		2924/381	. . . Pitch distance
		2924/384	. . . Bump effects
		2924/3841	 Solder bridging
		2924/386	. . . Wire effects
		2924/3861	 Sag
		2924/3862	 Sweep
		2924/40	. Details of apparatuses used for either manufacturing connectors or connecting the semiconductor or solid-state body
		2924/401	. . LASER
		2924/40101	. . . Mode
		2924/40102	 being pulsed
		2924/40103	 being continuous

2924/40105	. . .	Beam details
2924/4015		Shape
2924/402	. . .	Type
2924/40201		being a chemical
2924/40202		Deuterium Flouride [DF] LASER
2924/40203		Hydrogen Flouride [HF] LASER
2924/40207		Dye laser
2924/4025		being a gas
2924/40251		argon-ion LASER
2924/40252		CO ₂ LASER
2924/40253		HeAg LASER
2924/40254		HeNe LASER
2924/40255		NeCu LASER
2924/403		being an Excimer
2924/40301		ArF LASER
2924/40302		F2 LASER
2924/40303		KrCl LASER
2924/40304		KrF LASER
2924/40305		XeCl LASER
2924/40306		XeF LASER
2924/4035		being a fiber hosted LASER
2924/404		being a solid state
2924/40401		Free electron LASER
2924/40402		Photonic crystal LASER
2924/40403		Fiber solid state LASER
2924/40404		Yttrium Aluminium Garnet Nd:YAG LASER
2924/40405		Yttrium Lithium Flouride Nd:YLF LASER
2924/40406		Ruby LASER
2924/40407		Yb:YAG LASER
2924/405	. . .	Wavelength
2924/40501		UV spectrum
2924/40502		Visible spectrum
2924/40503		IR spectrum