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Selected Patents Related to Thermal Spraying

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CA denotes Canadian, CN denotes Chinese, DE denotes German, EP denotes European, JP denotes Japanese, RU denotes Russian, SE denotes Swedish, US denotes United States patents. The information has the following format: Title, Abstract, Patent number, Inventors, Company, Date of issue.

Applications

ACM Sensor and Manufacturing Method Therefor. Problem to be solved: To provide an ACM sensor whose service life is long, which is of high sensitivity, in which an irregularity in an output is small, in which a yield in its manufacture is high and whose cost can be lowered, and to provide its manufacturing method. Solution: The manufacturing method is composed of a pretreatment process, in which the anchor force on the surface of a substrate composed of a conductive material is enhances. The manufacturing method is composed of an insulating-film thermal spray process, in which an insulating material is thermally sprayed to the surface of the substrate so as to form an insulating film. The manufacturing method is composed of a conductive-film thermal spray process, in which the conductive material different from that of the substrate is thermally sprayed to the surface of the insulating film so as to form a conductive film. The manufacturing method is composed of a planarizing process, in which the surface of the conductive film is ground to be smooth. The manufacturing method is composed of a slit-working process in which the conductive film, and the insulating film are ground and removed in a slit shape. In the planarizing process and/or the silt-working process, an ELID grinding method in which a grinding operation is performed, while a conductive whetstone is dressed electrolytically is used.

JP 4249359: Omori Hitoshi, Yamagata Yutaka, Moriyasu Kiyoshi, Uehara Yoshihiro, Tsujikawa Shigeo, Shinohara Tadashi, and Asami Muneaki. Company: Nexsys Corp. Issued: April 2, 2009.

Axle Sleeve and Bush for Zinc Plating Pot Roller and Its Making Method. The present invention relates to an axle sleeve, an axle bush and a manufacture method used on the zinc pot roller in the continuous hot dip galvanizing production line in steel and metallurgy fields. The method of oxygen-fuel gas spray welding or plasma spray welding or laser melting is adopted, the cobalt-based or cobalt-based wire stock or powder is sprayed or melted on the matching surface of the axle sleeve and the axle bush to form a surface strengthened layer with the thickness of 2 to 5 mm. The axle sleeve and the axle bush manufactured through the method of the present invention greatly enhances the zinc resistance or aluminum zinc corrosion and friction resistance performance, the combination performance is good, the present invention is not easy to break off, and the service life is lengthened. The method can be suitable for preparation of a thick coating layer, and is simple and convenient, the cost is lower, and the utilization cost and the production cost of the enterprise can be directly reduced. The method can be used as the processing method of the parts which are mutually contacted and have opposite motion in the similar zinc or aluminum zinc solution corrosion environment to lengthen the service life.

CN 100473856: Hao Deng. Company: Guangzhou Ruiyou Surface Techn. Issued: April 1, 2009.

Brake Drum Used for Land Vehicles Has a Metallic Coating on Its Friction Surface. Brake drum has a metallic coating on its friction surface. An Independent claim is also included for a process for the production of a brake drum. Preferred Features: The drum has a non-ceramic coating on its inner periphery. The drum has a core made from cast iron material provided with a metallic spray coating or an explosion coating. The spray coating is applied by flame, arc or plasma spraying.

DE 10120326: Khambekar Syrakant, Pahle Wolfgang, Baumgartner Johann, and Flach Oskar. Company: Knorr Bremse Systeme. Issued: May 20, 2009.

Coated Metal Formed Article and Method for Producing Coated Metal Formed Article. A coated metal formed article, which has excellent the anti-rust properties and the corrosion resistance without performing a chromate treatment and without depending on the kind of a phenol compound to be added to an intermediate layer, and a method for forming such a coated metal formed article are provided. For the coated metal formed article and the method of forming such a coated metal formed article, a zinc-containing porous coating layer, a phenol-modified silicon compound layer, and a fluorine resin-containing layer are sequentially formed on the surface of a metal formed article, and the fluorine resin-containing layer contains a fluorine resin as well as at least one organic resin selected from a polyester resin, a polyacryl resin, a polyolefin resin, a polyurethane resin, and a polycarbonate resin, where the amount of the fluorine resin added is in the range of 1 to 200 parts by weight with respect to 100 parts by weight of the organic resin. A coated metal formed article, which has excellent the anti-rust properties and the corrosion resistance without performing a chromate treatment and without depending on the kind of a phenol compound to be added to an intermediate layer, and a method for forming such a coated metal formed article are provided.

US 7547477: Matsuno Takemi. Company: Nakata Coating Co Ltd. Issued: June 16, 2009.

Coated Running Surfaces of Combustion-Engine Cylinders and Process of Its Manufacture. Cylinder running surface layer applied by plasma spraying has a number of open pores and has a degree of porosity of 0.5-10%. The average pore size is 1-50 μm. The pores are distributed dimensionally or in a planar manner in the running surface layer surface. The cylinder running surface layer surface contains 0.5-8 wt.% oxygen with iron oxide (FeO) and iron oxide (Fe_3O_4) crystals to form a solid lubricant. The roughness of the cylinder running surface layer is adjusted to

0.02-0.4 μm (average roughness) with a depth of 0.5-5 μm. An Independent claim is also included for a process for the production of a cylinder running surface layer. Preferred Features: The cylinder running surface layer has a Vickers micro-hardness HV0.3 of 350-550 N/mm squared. The cylinder running surface layer has the following composition: 0.05-1.5 wt.% carbon (C), 0.05-3.5 wt.% manganese (Mn), 0.05-18 wt.% chromium (Cr), 0.01-1 wt.% silicon (Si), 0.001-0.4 wt.% sulfur (S) and a balance of iron (Fe).

EP 1340834: Barbezat Gerard. Company: Sulzer Metco AG. Issued: April 22, 2009.

Component for Vacuum Apparatus, Production Method Thereof and Apparatus Using the Same. A component for a vacuum apparatus for use in a plasma processing apparatus or a film forming apparatus for a semiconductor or the like, in which a surface is covered with a ceramic and/or metallic thermal spray film and projection-shaped particles of a width of 10-300 μm, a height of 4-600 μm and an average height/width ratio of 0.4 or higher are present within a range of 20-20000 particle/mm^2 on the surface of the thermal spray film. The thermal spray film has a porosity of 10-40%, shows a high adhering property to a film-shaped substance, is free from a product contamination by particles generated by a peeling of the film-shaped substance and can be continuously used over a prolonged period.

US 7531232: Takahashi Koyata, Matsunaga Osamu, and Okamoto Michio. Company: Tosoh Corp. Issued: May 12, 2009.

Composite Material Consisting of Intermetallic Phases and Ceramics and Production Method for Said Material. The invention concerns a composite material consisting of intermetallic phases and ceramic, in particular in the form of a coating on metallic substrates, as well as an arc wire spraying process for production of the composite material in which the intermetallic phases and the ceramics to be deposited are newly formed during the deposit process from the components of the supplied wires by chemical reaction. The invention further concerns wear resistant layers formed by the composites, tribologic layers and plating or hard-facing materials.

US 7553563: Grau Stefan, Scheydecker Michael, and Weisskopf Karl. Company: Daimler Chrysler AG. Issued: June 30, 2009.

Controlled Thermal Expansion of Welds to Enhance Toughness. A method is provided for forming a metallic overlay having enhanced toughness. The metallic overlay may be a weld, a metallic coating, or similar application. The method includes applying a glass forming metallic alloy to a substrate while the alloy is in a molten or semi-molten state. At the interface of the metallic alloy overlay and the substrate the substrate metal becomes at least partially molten and combines with the alloy to form metallurgical bonds. When the metallic alloy cools it experiences a high relative degree of thermal contraction. The metallurgical bonds between the substrate and the alloy constrain the contraction of the alloy at the interface with the substrate. This results in the inducement of compressive stresses in the metallic alloy overlay. The induced compressive stresses inhibit the formation of cracks in the overlay and/or mitigation of the effects of any cracks in the overlay. A method is provided for forming a metallic overlay having enhanced toughness. The metallic overlay may be a weld, a metallic coating, or similar application.

US 7540403: Branagan Daniel James. Company: Nanosteel Company Inc. Issued: June 2, 2009.

Conveying Roll and Hearth Roll for Continuous Annealing Furnace. Problem to be solved: To provide a conveying roll and a hearth roll for a continuous annealing furnace which have a thermal-spray film applied on their surfaces in order to simultaneously solve such problems as slippage, meandering, dust-sticking and build-up of a steel sheet. Solution: This conveying roll has the thermal-spray film having a ratio R/R′ of ≥4 on the surface, wherein R represents a roughness parameter measured by setting a cut-off value to an initial value according to JIS B 0633, and R′ represents a roughness parameter measured by setting the cut-off value to 1/10 of the initial value. The roughness parameter R is one of Ra, Rq, Rp, Rv, and Rz. The hearth roll has the roughness parameter Ra measured by setting the cut-off value to 2.5 mm of ≥2 μm. The thermal-spray film desirably consists of ceramics, cermet or heat-resistant alloy having 20 to 300 μm thickness.

JP 4268491: Kurisu Yasushi. Company: Nippon Steel Corp. Issued: May 27, 2009.

Device for Removing Cap of Pipe End. Problem to be solved: To make a cap mounted at one end of a pipe easily removable without the need for man power. Solution: This device is used to remove the cap mounted at one end of the pipe. The device has a cover for closing the other end of the pipe and a means for supplying pressurized air to the inside of the pipe through this cover. The device is utilized for removal of the pipe end cap used in cleaning of shot peening to be applied as a pretreatment for light metal thermal spraying to the outside surface of, for example, a cast iron pipe.

JP 4278262: Sekiguchi Yasushi, Kinoshita Masao, and Sato Kazutoshi. Company: Kubota Kk. Issued: June 10, 2009.

Donor Member's Coating. A donor member useful in ionographic or electrophotographic apparatuses and useful in hybrid scavengeless and hybrid jumping development units, the donor member having a substrate and an outer coating of a blend including metal and ceramic.

CN 100480880: Schlafer Michelle L. and Longhenry Joy L. Company: Xerox Corp. Issued: April 22, 2009.

Environmentally Protected Reinforcement Dowel Pins and Method of Making. Galvanically protected reinforcement dowel pins and methods of producing the same. In one embodiment, the reinforcement dowel pins comprise a bar or tube, the longitudinal exposed surfaces of which are covered by a heavy gauge of a sacrificial metal, such as zinc, zinc alloy, magnesium, magnesium alloy, aluminum, or aluminum alloy. The bar or tube comprises steel, carbon steel, or other ferrous metal. The heavy gauge of sacrificial metal is applied to the ferrous metal by various processes, such as roll bonding, lock seaming, welding, die casting, flame spraying, plasma spraying, dipping, sinking, and drawing. The resulting reinforcement dowel pins resist corrosion without sacrificing structural integrity, and are reasonable in materials

and manufacturing costs. These dowel pins may be installed in adjacent concrete panels using conventional methods, and therefore do not introduce additional costs in installation.

US 7553554: Miller Wes, Schenk Christopher P., and Tarrant Derek. Company: Alltrista Zinc Products. Issued: June 30, 2009.

Film-Forming Apparatus Component and Method for Cleaning Same. There are provided a film forming equipment component having a structure in which an deposited film formed on the component can be separated from the component for a time period shorter than the prior art to reduce damage due to a cleaning fluid, and a method of cleaning such a component. A metal film layer electrochemically less noble than the matrix metal material of the aforementioned component is formed on the surface of the matrix metal material through thermal spraying, vapor depositing, sputtering, laminating or other process. Alternatively, a second metal film layer electrochemically more noble than the aforementioned matrix metal material is formed on the surface of the metal film layer through said thermal spraying or other process. Thus, a local cell is formed between the metal film layer and the matrix metal material or the second metal film layer. Therefore, the deposited film can be separated from the matrix metal material for an extremely shortened time period, without damaging the matrix metal material 1 itself from the cleaning fluid.

CN 100476037: Hirata Akisuke, Isoda Shinji, Kadowaki Yutaka, and Mushiake Katsuhiko. Company: Harima Chemicals Inc, Ulvac I. Issued: April 8, 2009.

Hard Metallic Materials, Hard Metallic Coatings, Methods of Processing Metallic Materials and Methods of Producing Metallic Coatings. The invention includes a method of producing a hard metallic material by forming a mixture containing at least 55% iron and at least one of B, C, Si and P. The mixture is formed into an alloy and cooled to form a metallic material having a hardness of greater than about 9.2 GPa. The invention includes a method of forming a wire by combining a metal strip and a powder. The strip and the powder are rolled to form a wire containing at least 55% iron and from 2-7 additional elements including at least one of C, Si and B. The invention also includes a method of forming a hardened surface on a substrate by processing a solid mass to form a powder, applying the powder to a surface to form a layer containing metallic glass, and converting the glass to a crystalline material having a nanocrystalline grain size.

CN 100503843: Branagan Daniel J. Company: Bechtel Bwxt Idaho Llc. Issued: June 24, 2009.

High-Cr Ni-Base Nano Coat Powder and Preparation Method Thereof. The invention is a component and preparation method of nickel nano-powder material with high Cr content, belonging to metal material filed. The invention is particularly suitable to be used for defending and repairing the four tubes of the coal burning boiler which are damaged by high temperature corrosion and abrasion. The weight percentage of the components of the powder material is as follow: 50 to 52% of nickel, 44 to 46% of chromium and 1 to 2% of carbon. The method comprises the steps as follow: prepare the primary powder through vacuum melting and atomization powder producing technique; and process the powder for 16 to 20 h through ball milling technique under the protection of liquid nitrogen to produce powder, and the grain size of the powder is nanometer level. The powder material has excellent fluidity and thermal stability. The invention has the advantages of improving the quality and the level of the defending coat, increasing the comprehensive service performance of the coat, further increasing the anti high temperature corrosion and abrasion capability of the four tubes of the coal burning boiler. The organization density, the micro-penetration hardness, the anti sulfuration corrosion capability and the anti oxidation capability under 500 to 650 °C of the nano-structure coat which is prepared by the powder material through supersonic speed flame spray coating are all better than that of the micron meter structure coat which has the same components and is prepared by the same method.

CN 100500923: Xianglin Zhou, Jishan Zhang, Hua Cui, and Kai Tao. Company: Univ Beijing Science & Tech. Issued: June 17, 2009.

Injection Moulding Mould Part with Wear-Resistant Coating. Injection moulding mould part consisting of a mirror and a venting ring that can be moved with respect thereto. A wear-resistant coating has been applied to the mirror and/or the interface between the two parts that can be moved with respect to one another. This coating consists of hard metal based on tungsten with a minimum thickness of 0.01 mm and more particularly with a thickness of at least 0.1 mm. This coating is applied with an HP-HVOF process (High Velocity Oxygen Fuel).

CN 100482440: Tijl Herm Adrianus, Van Rijt Marcelis Johannes, and Van De Mortel Henricus Johanna. Company: Axxicon Moulds Eindhoven BV. Issued: April 29, 2009.

Inner Pot for Induction Heating Rice Cooker. Problem to be solved: To provide an inner pot for induction heating rice cooker, which has improved corrosion resistance property, capable of preventing smell of a food or drink from generating. Solution: The inner pot for induction heating type rice cooker comprises a base container with opening in the top surface, an outer aluminum body molded outside the base container, a stainless steel magnetic film thermally sprayed onto the surface of the external body so as to generate heat by means of magnetic force line of an induced current, and an aluminum cover part thermally sprayed onto the outer surface of the magnetic film.

CN 100479721: Kim Won Young and Sung Yu Ho. Company: Cuckoo Electronics Co Ltd, Pokgo E. C. L. Issued: April 22, 2009.

Inner Pot of Electric Pressurized Rice Cooker. Problem to be solved: To provide an inner pot of an electric pressurized rice cooker which can improve generation of steps or gaps between an inner part and an outer part by difference of thermal expansion coefficients between the inner part and the outer part of the inner pot. Solution: The invention relates to an inner pot of an electric pressurized rice cooker. The inner pot includes: a container patterned inner part comprising a nonmetallic material and having a hanger part with a projection or a ditch at an upper step; an outer part comprising a metallic material and formed on a part except

the inner surface of an inner part so as to engage with the hanger part; and a magnetic body part comprising a magnetic body and being thermal sprayed on the outer surface of an outer part.

CN 100482143: Kim Jae Ki and Kim Won Young. Company: Cuckoo Electronics Co Ltd, Pokgo E. C. L. Issued: April 29, 2009.

Insert Casting Component, Cylinder Block, Method for Forming Coating on Insert Casting Component, and Method for Manufacturing Cylinder Block. A liner outer surface is coated by a sprayed layer or a heterogeneous metal layer including a base metal phase and dispersed metal phases. During casting, liquid metal enters the sprayed layer from the dispersed metal phases and solidifies in a virtual vegetation root state. The surface of the cylinder block is thus rigidly fixed to the surface of the cylinder liner. In this case, a strong bonding force is produced between the cylinder block and the cylinder liner and high thermal conductivity is obtained compared to the prior art in which the liquid metal merely contacts a surface layer.

US 7513236: Miyamoto Noritaka, Sato Takashi, Horigome Masami, Saito Giichiro, Mihara Toshihiro, Yamashita Nobuyuki, Shibata Kouhei, Takami Toshihiro, and Hirano Masaki Company: Teikoku Piston Ring Co Ltd, Teipi K. K. T. M. C. L. Issued: April 7, 2009.

Method and Apparatus for Spray Processing of Porous Medical Devices. Thermal spray processing and cold spray processing are utilized to manufacture porous starting materials (such as tube stock, wire and substrate sheets) from biocompatible metals, metal alloys, ceramics and polymers that may be further processed into porous medical devices, such as stents. The spray processes are also used to form porous coatings on consolidated biocompatible medical devices. The porous substrates and coatings may be used as a reservoir to hold a drug or therapeutic agent for elution in the body. The spray-formed porous substrates and coatings may be functionally graded to allow direct control of drug elution without an additional polymer topcoat. The spray processes are also used to apply the drug or agent to the porous substrate or coating when drug or agent is robust enough to withstand the temperatures and velocities of the spray process with minimal degradation.

US 7514122: Kramer Pamela A. Company: Advanced Cardiovascular System. Issued: April 7, 2009.

Method for Applying a Protective Coating Over a High Temperature Component. In a repair process for a thermally stressed component, e.g. gas turbine engine combustion chamber, the defective zone is first cleaned, followed by application of the repair agent. In the first stage, a bevelled edge is cut in the periphery of the damaged zone.

US 7544520: Kiliani Stefan, Stankowski Alexander, Szuecs Frigyes, and Duda Thomas. Company: Alstom Switzerland Ltd. Issued: June 9, 2009.

Method for Forming Film Resistant to High-Temperature Corrosion, and Film Resistant to High-Temperature Corrosion. Problem to be solved: To provide a method for forming a film which is resistant to high-temperature corrosion and greatly improves the resistance to high-temperature corrosion and abrasion of a surface coated therewith; and a film resistant to high-temperature corrosion. Solution: The film resistant to high-temperature corrosion is formed by forming a substrate layer comprising an alloy mainly comprising Ni and Cr on the surface of a base material with a supersonic plasma thermal spray apparatus of an internal port type and forming, on the substrate layer, a surface layer comprising a ceramic mainly comprising stabilized ZrO_2 or partially stabilized ZrO_2; thus, the resistance to high-temperature corrosion and abrasion of the surface of the base material is greatly improved. When an apparatus or material with the film resistant to high-temperature corrosion formed thereon is used in a high-temperature corrosion environment, e.g. in a power generation plant using waste, the contact of combustion ash with the substrate layer is prevented and an excellent resistance to dew-point corrosion during operation stopping is exhibited.

JP 4255264: Yamada Kenichi, Irie Masanobu, and Mito Yoshiichi. Company: Yamada Kinzoku Boshoku Kk. Issued: April 15, 2009.

Method for Making an Infused Composite. A metal surface infused composite object made by thermal spraying a metal material onto a release agent coated pattern, followed by vacuum infusion at least a portion of the metal material layer with a resin and then separating the composite infused metal object from the pattern.

CN 100484360: Grinberg Grigoriy and Shade Matthew M. Company: Praxair Technology Inc. Issued: April 29, 2009.

Method for Plasma Spraying of Wearable Coating for Aluminium Alloy Matrix Surface. This invention provides a plasma spray wear-resisting coating method for the aluminum alloy base surface, which has the following steps: doing surface preprocessing with the spray work piece, installing the work piece on the movable workbench, covering the work piece with semi closed cover; drying the spray-waiting powder and loading it to the powder delivering machine; setting plasma spray technology parameter, opening inert gas valve, filling inert gas in semi closed cover, lighting spray gun, after the spray felt bottom reaches regulated thickness, stopping filling inert gas and opening spray gun; wherein changing powder or switching powder delivering machine, lighting spray gun, spraying working layer can use condensation air to cool spray work piece. This invention improves the joining intension of the coating layer and base greatly by using inert gas, wherein the joining intension is more than 30 MPa, which reaches the level of the joining intension of the steel surface plasma spray coating and base.

CN 100478486: Wang Zehua Fang. Company: Hehai University. Issued: April 15, 2009.

Method for Preparing Al-Si-Cr Coat by Low-Voltage Plasma Spraying. The invention discloses a method for preparing the Al-Si-Cr coat by utilizing the low voltage plasma spray coating. The method comprises the steps as follow: the Al-Si-Cr coat is made on the Nb-24Ti-16Si-6Al-6Cr-2Hf base body by utilizing the plasma spray coating technique with low voltage of 30 to 40 multiplied by 103 pa, which shapes an inter-diffusion layer that is 5-15Mum between a base body and a coat; the Al-Si-Cr coat can shape continue and compact Al_2O_3 and SiO_2 mixed oxide layer when oxidized under high temperature of 1000 to 1250 DEG C, thereby stopping the coat and the base body from being further oxidized and improving the anti high temperature

oxidization property of the Nb-24Ti-16Si-6Al-6Cr-2Hf base body; and the unit area weight of the surface of the base body which is provided with a coat is increased to 506 to 16.8 milligram per square centimeter. The Al-Si-Cr coat consists of a mixing layer and an inter-diffusion layer, wherein, the Al-Si-Cr mixing layer comprises the following three phases: Cr (Si, Al) 2, Al and Si; and the inter-diffusion layer comprises the elements as follow: Nb, Ti, Si, Al and Cr.

CN 100494468: Chungen Zhou, Dengzun Yao, Rui Cai, Hu Zhang, and Huibin Xu. Company: Univ Bei Hang. Issued: June 3, 2009.

Method for Repairing Furnace Wall of Carbonizing Chamber. Problem to be solved: To provide a method for repairing a furnace wall of a carbonizing chamber in which smoothness of a repairing surface of a repairing part is further improved compared with a conventional method and increase of extrusion resistance in coke extrusion is suppressed and the life of the carbonizing chamber can be prolonged. Solution: The method for repairing the furnace wall of the carbonizing chamber comprises repairing the furnace wall by blowing a flame-spraying raw material into a damaged part of the furnace wall of the carbonizing chamber in a belt-like state. In the repairing method, blowing of the flame-spraying raw material is carried out in a state laminated several times and a flame-spraying raw material forming the following layer toward a valley part between the flame-spraying raw materials formed by previous layer.

JP 4283692: Noguchi Toshihiko, Goto Masatoshi, and Nakajima Atsushi. Company: Nippon Steel Corp. Issued: June 24, 2009.

Method for the Flame Spray Coating of Surfaces with Powder to Create the Lotus Effect. A process for producing self-cleaning surfaces by a dry coating process. The process produces self-cleaning surfaces that have elevations formed by particles applied dry to the surface by a modified flame-spraying process. The process can equip textiles and other articles, in particular those having plastic surfaces, with self-cleaning properties.

JP 4273076: Oles Markus and Nun Edwin. Company: Creavis Tech & Innovation Gmbh, Degussa. Issued: June 3, 2009.

Method for the Formation of a Good Contact Surface on an Aluminium Support Bar and Electrolysis Cell. The invention relates to a method for achieving a good contact surface on an aluminium electrode support bar used in electrolysis. In the method the support bar is fabricated as a continuous bar and a highly electroconductive layer is formed on its end. The highly electroconductive layer forms a metallic bond with the support bar and can be achieved for example with thermal spray coating. The invention also relates to an electrode support bar, the end of which is coated with a highly electroconductive material.

AU 2003279423: Osara Karri and Polvi Veikko. Company: Outokumpu Oy. Issued: April 23, 2009.

Method for the Manufacture of an X-Ray Tube Cathode Filament, and X-Ray Tube. A method for the manufacture of a cathode filament of an X-ray tube and an X-ray tube formed by the method wherein the filament has at least two legs and one body, the filament being a single-piece filament. Spraying at least one material on a support by plasma spraying or by another deposition technique to obtain the filament molded on the support and separating the filament obtained from the support. The filament obtained has a variable thickness and a variable composition. The thicknesses of the legs and of the body as well as the composition of the filament can be modified according to the user's needs. An embodiment of the invention also relates to an X-ray tube provided with a cathode filament of this kind.

US 7516528: Lemarchand Gwenael and Penato Jean-Marie. Company: GE Medical Systems. Issued: April 14, 2009.

Method of Forming a Vibration Damping Coating on a Metallic Substrate. A method of forming a vibration damping coating on a metallic substrate, e.g. a titanium alloy aerospace component, comprises applying to the metallic substrate a coating comprising a spinel having regions of relative oxide or nitride imbalance.

US 7527874: Shipton Mark Henry and Patsias Sophoclis. Company: Rolls Royce Plc. Issued: May 5, 2009.

Method of Manufacturing a Photocatalytic Active Layer. In a process to manufacture metallic objects e.g. foil, sheet metal components or formed components bearing a photo-catalytic active surface, the active material is applied as a cold gas spray incorporating a ceramic oxide and a metallic powder. The cold gas incorporates titanium dioxide powder e.g. Atanas. The individual ceramic oxide particles are encased within a metal or metal alloy representing 30-60% Vol. The metal surface has a photo-catalytic particle coating represents 30-80% of the surface area. The outer layer is subject to further mechanical or chemical treatment.

EP 1785508: Heinrich Peter, Kreye Heinrich Prof Dr, Schmidt Tobias, and Gaertner Frank Dr. Company: Linde AG. Issued: April 8, 2009.

Method of Manufacturing Aluminide Sheet by Thermomechanical Processing of Aluminide Powders. A powder metallurgical process of preparing a sheet from a powder having an intermetallic alloy composition such as an iron, nickel or titanium aluminide. The sheet can be manufactured into electrical resistance heating elements having improved room temperature ductility, electrical resistivity, cyclic fatigue resistance, high temperature oxidation resistance, low and high temperature strength, and/or resistance to high temperature sagging. The iron aluminide has an entirely ferritic microstructure which is free of austenite and can include, in wt.%, 4 to 32% Al, and optional additions such as ≤1% Cr, ≥0.05% Zr ≤1 = 2% Ti, ≤2% Mo, ≤11% Ni, ≤10.75% C, ≤10.1% B, ≤1 = 1% submicron oxide particles and/or electrically insulating or electrically conductive covalent ceramic particles, ≤1% rare earth metal, and/or ≤13% Cu. The process includes forming a non-densified metal sheet by consolidating a powder having an intermetallic alloy composition such as by roll compaction, tape casting or plasma spraying, forming a cold rolled sheet by cold rolling the non-densified metal sheet so as to increase the density and reduce the thickness thereof and annealing the cold rolled sheet. The powder can be a water, polymer or gas atomized powder which is subjecting to sieving and/or blending with a binder prior to the consolidation step. After the consolidation step, the sheet can be partially sintered. The cold rolling and/or annealing steps can be repeated to

achieve the desired sheet thickness and properties. The annealing can be carried out in a vacuum furnace with a vacuum or inert atmosphere. During final annealing, the cold rolled sheet recrystallizes to an average grain size of about 10 to 30 μm. Final stress relief annealing can be carried out in the B2 phase temperature range.

JP 4249899: Hajaligol Mohammad R., Scorey Clive, Sikka Vinod K., Deevi Seetharama C., Fleischhauer Grier, Lilly A. Clifton Jr., and German Randall M. Company: Chrysalis Tech Inc. Issued: April 8, 2009.

Method of Producing Ceramic Spray-Coated Member, Program for Conducting the Method, Storage Medium and Ceramic Spray-Coated Member. A ceramic spray-coated member capable of surely controlling adhesion and detachment of water is produced by spraying a given ceramic onto a surface of a base material, in which an organic matter adsorbed on a surface of the ceramic spray-coated member is removed and the surface of the ceramic spray-coated member is stabilized by chemically bonding to water.

CN 100494471: Moriya Tsuyoshi, Nakayama Hiroyuki, Nagaike Hiroshi, Kobayashi Keigo, and Yasuda Kaname. Company: Tocalo Co Ltd, Tokyo E. L. Issued: June 3, 2009.

Nanocrystalline Composite Material Based on Al_2O_3 ZrO_2 SiO_2 and Its Production Method. The merits of the present invention is production of commercially utilizable three-dimensional articles with nanocrystalline composite structure from a material based on Al_2O_3-ZrO_2-SiO_2. The nanocrystalline composite material contains 45-58 wt.% Al_2O_3, 28-38 wt.% ZrO_2, 9-25 wt.% SiO_2, its total porosity is below 5% and contains two levels of internal structure. At the micrometer level, the material is made up from mutually overlapping, thin and wavy discs (called splats) with thickness of up to 3 μm. The splats are formed by thermal spraying process and their respective chemical composition varies slightly. Inside of each splat, nanometer sized crystallites are found with average sizes ranging from 8 to 25 run and narrow size distribution. The nanometer sized crystallites are solely of one phase, which is the solid solution of tetragonal ZrO_2 with Al_2O_3 and SiO_2. The method producing the above material is as follows. Material containing Al_2O_3, ZrO_2, and SiO_2, is melted in arc furnace, the melt is casted, cooled, and crushed into powder with particle size below 120 μm. A coating is produced by thermal spraying of the powder onto a model preheated to 100-400 °C. The amorphous coating is removed during cooling and the temperature of crystallization in solid state (Tk) is determined by differential thermal analysis of the coating sample. The coating is then heated at a minimum heating rate of 5 K/s to a temperature from Tk −10 °C to Tk +80 °C, and after a dwell time of up to 60 min cooled at a minimum cooling rate of 5 K/s to the room temperature.

CZ 300602: Chraska Tomas and Neufuss Karel. Company: Inst of Plasma Physics ASCR. Issued: June 24, 2009.

Phosphate Containing Bone Substitute Product with Crystalline and Amorphous Phases. Bone substitute material comprises 70-99.9 wt.% orthophosphates and 0.1-30 wt.% diphosphates and comprises 30-99.9 wt.% of a primary crystal phase consisting of calcium sodium and/or potassium orthophosphates of formula (I), 0.1-20 wt.% of a secondary crystal phase consisting of disodium calcium diphosphate, dipotassium calcium diphosphate and/or dicalcium diphosphate, and 0.1-70 wt.% of an amorphous phase. Ca2K1 − xNa1 + x(PO4)2 (I) x = 0.1-0.9. Independent claims are also included for: (1) a process for producing the bone substitute material; (2) glass for use as a sintering aid for bioabsorbable calcium phosphate materials other than beta-tricalcium phosphate, having the following oxide composition (wt.%): silicon (73-78), magnesium (8-11), sodium (12-19), potassium (0-22), phosphorus (0-20). The present invention relates to an X-ray amorphous-crystalline material with high solubility which can be used as a bioactive bone replacement material and as a substrate material in biotechnology.

US 7547448: Berger Georg, Spitzer Andrea, Jaeger Christian Prof, Pauli Jutta, and Gildenhaar Renate. Company: Bundesanstalt Fuer Material Forschung Und Pruefung. Issued: June 16, 2009.

Piercing Plug, Method for Regenerating Piercing Plug, and Regeneration Facility Line for Piercing Plug. Since a coating film composed of an oxide such as Fe_3O_4 or FeO and Fe (metal) is formed on the surface of a base material by electric arc spraying of an iron wire principally comprising Fe, a piercing plug can attain excellent heat shielding properties and seizure prevention properties due to this coating film, and the plug can have a long life. When the plug is regenerated, a coating the film can be formed again by sequentially performing shot blasting and arc spraying on a just-pierced plug, and thus the plug can be regenerated in a short time at a low cost.

JP 4279350: Hidaka Yasuyoshi, Shimoda Kazuhiro, Nakaike Kouji, Hirase Naoya, Higashida Yasuto, Inage Takateru, Nagakita Jyun, Nakamori Masaharu, Yoshikawa Fumihito, Hayashi Yoshihiko, and Aisaka Takayuki. Company: Osaka Fuji Corp, Sumitomo M. I. Issued: June 17, 2009.

Piezo-Electric Substrate and Manufacturing Method of the Same. Problem to be solved: To provide a piezo-electric substrate of which expansion and contraction caused by changes in temperature are sufficiently suppressed, and a manufacturing method of the same. Solution: A piezo-electric substrate 1 mainly comprises a base material and a film formed on one main surface of the base material. In the base material, the main surface on which the film is formed is a roughed main surface. The piezo-electric substrate is obtained by forming the film comprising a material with a coefficient of linear expansion smaller than a coefficient of linear expansion of the base material on the roughened main surface using a thermal spraying method.

JP 4247281: Tamura Noboru, Ichikawa Nakaba, Takahata Takeshi, and Yasuda Kaname. Company: Koike Co Ltd, Tocalo C. L. Issued: April 2, 2009.

Piston Ring and Thermal Sprayed Coating for Use Therein, and Method for Manufacture Thereof. CN 100489144: Yukio Obara Ryou Takiguchi Kat. Company: Riken K K. Issued: May 20, 2009.

Press Roll for Paper Machine, Pressing Method for Wet Paper, and Surface Polishing Method for Paper Machine Press Roll. A paper machine press roll comprises a core roll and a ceramics sprayed film formed on an outer

periphery of the core roll, in which values of Rk and Vo which are characteristic evaluation parameters of a plateau-structure surface of the ceramics sprayed film are Rk ≤8.0 μm and Vo ≥0.030 mm^3/cm^2. (Vo = (100 − Mr2) × Rvk/2000 (mm^3/cm^2) where Rk, Mr2 and Rvk are a core level difference, a core load length ratio and a projecting valley depth, respectively which are defined in JIS B0671-2-2002 (ISO13565-2-1996).

EP 1728922: Watanabe Atsuo. Company: Yamauchi Corp. Issued: May 20, 2009.

Process for Structuring Self-Cleaning Glass Surfaces. A plasma spray process for structuring self-cleaning glass surfaces and self-cleaning glass surfaces formed according to the process. Molten or heat softened particles of inorganic material are plasma spray deposited onto the surface of a substrate to create a micro-rough surface. If desired, a hydrophobic top coating layer can optionally be applied to the micro-rough surface. The micro-structured surface formed according to the invention is durable and self-cleaning.

US 7527832: Sakoske George E., Baumann Martin, and Axtell Enos a Iii. Company: Ferro Corp. Issued: May 5, 2009.

Process for the Preparation of Spheroidal Hard Material Powder. Production of spheroidized hard metal powder comprises (1) producing a finely-ground hard metal powder base mixture, granulate or suspension such that the constituents undergo a chemical reaction with one another, the gas and/or the dispersant and/or alloy formation occurs under high frequency plasma conditions; and (2) introducing this with a carrier gas stream into the operating gas stream of a thermal, inductively coupled high frequency plasma.

CA 2320529: Flurschuetz Walter, Horn Rudi, Klein Alexander, and Zakharian Simon. Company: Durum Verschleisschutz Gmbh. Issued: May 5, 2009.

Process for the Thermal Spraying of Cylinder Bearing Surfaces in Multi-Line Engines. In a process for thermal spraying of cylinder bearing surfaces of multi-line engines, a cylinder crankcase having at least two lines of cylinders is cast, those surfaces of subsequent cylinder barrels which are to be thermally coated are roughened, the cylinder barrels are coated by a thermal spraying process, and the cylinder barrels are remachined to their final dimensions. During thermal spraying, a shielding template is introduced in the region of the crankshaft space at least between a cylinder which is currently being thermally coated and an opposite cylinder of an adjacent line of cylinders. The present invention relates to a process for the thermal spraying of cylinder bearing surfaces in multi-line engines.

FR 2874932: Boehm Jens, Brackenhammer Dieter, Diessner Stefan, Heuberger Axel, Izquierdo Patrick, Pfeffinger Harald, Schilling Dezsoe, Traber Juergen, Vocino Nazario, and Zwink Walter. Company: Daimler Chrysler AG. Issued: April 24, 2009.

Production of Calcium Phosphate Material. Problem to be solved: To simply improve biological affinity by applying an aq. solution containing phosphorus ion, which contains trace element existing in living body, on a calcium phosphate based compound layer formed into a core material and firing in vacuum or inert gas atmosphere to form a solid solution with the trace element. Solution: A layer of a calcium phosphate based compound such as hydroxy apatite is formed on the core material of a titanium material or the like by plasma spraying method. The layer after coated with a phosphoric acid aq. solution such as the aq. solution, which contains about 1-50 wt.% phosphorus ion and in which 0.1-30% trace element such as Mg, Zn, Fe of the element existing in the living body is added if necessary, is fired in vacuum or inert gas atmosphere such as Ar at 300-1500 °C, preferably 800-1200 °C for about 10 min to 2 h. As a result, the calcium phosphate material obtained by forming the solid solution with the trace element, composed of tricalcium phosphate and excellent in biological affinity and bone proliferation ability is obtained.

JP 4282799: Umetsu Giichi. Company: Advance Co Ltd. Issued: June 24, 2009.

Quartz Glass Component with Reflector Layer and Method for Producing the Same. Methods for producing a quartz glass component with reflector layer are known in which a reflector layer composed of quartz glass acting as a diffuse reflector is produced on at least part of the surface of a substrate body composed of quartz glass. In order, taking this as a departure point, to specify a method which enables cost-effective and reproducible production of uniform SiO_2 reflector layers on quartz glass components, it is proposed according to the invention that the reflector layer is produced by thermal spraying by means of SiO_2 particles being fed to an energy carrier, being incipiently melted or melted by means of said energy carrier and being deposited on the substrate body. In the case of a quartz glass component obtained according to the method, the SiO_2 reflector layer is formed as a layer which is produced by thermal spraying and has an opaque effect and which is distinguished by freedom from cracks and uniformity.

DE 102006062166: Werdecker Waltraud, Gerhardt Rolf, and Weber Juergen. Company: Heraeus Quarzglas, Shinetsu Q. P. C. Issued: May 14, 2009.

Resistive Heaters and Uses Thereof. The present invention features a metallic resistive heater and uses thereof. The resistive heater includes a metallic component that is electrically conductive (i.e., has low resistivity) and an oxide, nitride, carbide, and/or boride derivative of the metallic component that is electrically insulating (i.e., has high resistivity). The resistivity is controlled in part by controlling the amount of oxide, nitride, carbide, and boride formation during the deposition of the metallic component and the derivative.

CN 100493267: Abbott Richard C., Magnant Gary P., and Glenn William A. Company: Thermoceramix Inc. Issued: May 27, 2009.

Rolling Bearing Assembly Having an Improved Resistance to Electric Corrosion. To provide an improved rolling bearing assembly having an improved resistance to electric corrosion, which can provide a proper performance and can be assembled at a reduced cost, the rolling bearing assembly includes an inner race, an outer race and a circumferential of rolling elements rollingly interposed between the inner and outer races. An electrically insulating layer is formed on a surface of one of the inner and outer races, which is held in contact with a housing or a shaft when the

rolling bearing assembly is mounted. This electrically insulating layer is made of a gray alumina containing Al_2O_3 mixed with TiO_2 in a quantity chosen to be equal to or smaller than 1 wt.% relative to the total weight of the gray alumina.

EP 1528274: Tsuji Naoaki and Ito Hideji. Company: NTN Toyo Bearing Co Ltd. Issued: June 3, 2009.

Rotor for Rubber Kneading Machine. Problem to be solved: To provide an inexpensive rotor for a rubber kneading machine, with excellent wear resistance and corrosion resistance and of a prolonged service life. Solution: A self-fluxing alloy is thermal-sprayed on a surface of a base carbon steel. The self-fluxing alloy includes nickel one and cobalt one. In addition, cermet containing tungsten carbide is also used. In order to obtain the rotor of high adhesion and toughness and of the prolonged service life, it is effective to form a thermal-sprayed coating of a composite-layer structure of the self-fluxing alloy containing no tungsten carbide and cermet containing tungsten carbide.

JP 4264219: Hiromatsu Kazuo, Sakakibara Noriyuki, Takahashi Kazuhito, Hanada Shuichi, Nakahara Akira, Kimura Minoru, Morita Tomio, Mori Joji, Uchibayashi Tetsuo, and Kondo Ryoji. Company: Fujiki Kosan, Mitsubishi H. I. L. Issued: May 13, 2009.

Shielded System with a Housing Having a High Atomic Number Metal Coating Applied by Thermal Spray Technique. A radiation-shielded system and method of producing a radiation-shielded system having at least one component susceptible to disruption upon exposure to ionizing radiation, wherein-the susceptible component is protected by a rigid housing having a metallic layer of high atomic number that is deposited on the surface of the housing using a thermal spray technique.

EP 1431413: Coker Edward J. and Prlina Michael G. Company: Boeing Co. Issued: May 6, 2009.

Sprayed Film of Yttria-Alumina Complex Oxide. An object of the invention is to provide a film of an yttria-alumina complex oxide having a high peel strength of the film to a substrate. A mixed powder of powdery materials of yttria and alumina is sprayed on a substrate to form a sprayed film made of an yttria-alumina complex oxide. Preferably, the powdery material of yttria has a 50 percent mean particle diameter of not smaller than 0.1 μm and not larger than 100 μm, and the powdery material of alumina has a 50 percent mean particle diameter of not smaller than 0.1 μm and not larger than 100 μm. Preferably, the yttria-alumina complex oxide contains at least garnet phase, and may further contain perovskite phase.

JP 4277973: Yamada Hirotake and Ohashi Tsuneaki. Company: NGK Insulators Ltd. Issued: June 10, 2009.

Substrate Having Catalyst Compositions on Surfaces of Opposite Sides and Method for Producing the Same. A bi-laterally surfaced substrate in which the first surface consists of one or more than one of cerium oxide, aluminum oxide, tin oxide manganese oxide, copper oxide, cobalt oxide, nickel oxide, praseodymium oxide, terbium oxide, ruthenium, rhodium, palladium, silver, iridium, platinum and gold and the second surface consists of one or more than one of ruthenium, rhodium, palladium, silver, iridium, platinum and gold and micro channel micro component reactors including such substrates in a predetermined formed shape and methods for making the same utilizing a thermal spray on one side and a physical deposition process on the other side.

JP 4272520: He Ting, Nomura Tadashi, and Kimura Eisuke. Company: Honda Motor Co Ltd. Issued: June 3, 2009.

Substrate Table, Production Method Therefor and Plasma Treating Device. The susceptor of a plasma treating device, or the electrostatic chuck of a substrate table is formed by ceramic thermal spray method. A ceramic spray layer is pore-sealed by methacrylic resin. Resin raw material mainly containing methyl methacrylate is applied to and impregnated into the ceramic spray layer and then is cured to thereby fill pores between ceramic particles in the ceramic spray layer with methacrylic resin. Methacrylic resin raw material solution, which does not produce pores at curing, can complete perfect pore sealing.

US 7544393: Muto Shinji, Taguchi Chihiro, and Okayama Nobuyuki. Company: Tokyo Electron Co Ltd. Issued: June 9, 2009.

Thermal Spraying of a Piston Ring. The invention relates to a piston ring coated with a coating material by a thermal spray process, exposed to heat treatment of the coating material at an elevated temperature and for a time effective to at least partially diffuse the coating material into the piston ring surface or underlying layer of coating material, and an additionally applied coating material layer subject to successive heat treatments of each coating material layer in order to lay down on the piston ring surface a plurality of layers of the same coating material.

JP 4267459: Aram Mehdi. Company: Kensantla Holding Ab. Issued: May 27, 2009.

Thermal Spraying Powder Material for Corrosion-Resistant Film, Highly Corrosion-Resistant Film, Anode Container for Sodium-Sulphur Battery, and Method for Manufacturing the Same. Problem to be solved: To provide a thermal spraying powder material for a corrosion-resistant film which is easily available and inexpensive, and contributes to simplification and automation of the thermal spraying steps, and the cost reduction, and from which the corrosion-resistant film having excellent corrosion resistance and adhesiveness can be formed by thermal spraying on the surface of a predetermined metallic material. Solution: The thermal spraying powder material for a corrosion-resistant film is used for forming a corrosion-resistant film by thermal spraying on an internal peripheral surface of a container body of an anode container for a sodium-sulphur battery having the cylindrical container body formed of a metallic material. The molten pulverized powder consists of an alloy with chromium (Cr)-iron (Fe) as a base, which contains, by mass, 55-70% chromium (Cr) and 3-20% carbon (C).

JP 4275585: Mima Toshiyuki, Furuta Kazuto, and Ando Takashi. Company: NGK Insulators Ltd. Issued: June 10, 2009.

Thermally Sprayed Coating Film on Ceramic Surface. Problem to be solved: To prevent the decrease of the bonding strength of a thermally sprayed layer composed of a copper alloy or stainless steel to a ceramic, which is caused by the repeat of temp. cycle, and the easily stripping from a ceramic by

slight external force. Solution: The thermally sprayed coating film is formed by successively applying a metallized layer composed of molybdenum-manganese, a plated layer composed of Ni, a 1st thermally sprayed layer composed of nickel- aluminum and a 2nd thermally sprayed layer composed of the copper alloy or stainless steel on the surface of the ceramic. The ceramic and the 2nd thermally sprayed layer are rigidly bonded to each other and hardly stripped from each other even by being exposed to the repeat of the temp. cycle.

JP 4268238: Ushio Yoshihiro. Company: Kyocera Corp. Issued: May 27, 2009.

Thermally Sprayed Conformal Seal. A conformal seal for sealing air flow between a cooling airflow path and a hot gas flow path within a combustion turbine engine. The conformal seal may be fitted within cooperating side slots of adjacent vane segments within the combustion turbine engine. The conformal seal may include an elongated metallic substrate forming an upper surface and a lower surface. A conformal coating may be deposited over one or both surfaces of the substrate. The conformal coating may be deposited to a depth so that a point contact between the conformal coating and respective interior walls of the side slots wears the conformal coating to establish surface area contact there between. The surface area contact improves a sealing function between the conformal coating and the respective interior walls during operation of the combustion turbine engine.

US 7527472: Allen David B. Company: Siemens Energy Inc. Issued: May 5, 2009.

Two-Way Protecting Beam-Pumping Unit Connected Hoop. This is a kind of bidirectional jointing hoop to protect the sucker rod. The surface of the jointing hook is with a layer of coating using thermal spraying technique. The thickness is 0.26-0.6 mm. The coating includes: carbon 0.3-0.6%, silicon 3.5-4%, boron 3.5-4%, chromium 15-16%, copper 3-3.5%, molybdenum 3-3.5%, iron 3-5%, nickel 63.9-68.7%. This invention has good anti-friction and corrosion preventive ability.

CN 100485157: Huang Jinbin Zhang. Company: Andongaoer Engineering Technol. Issued: May 6, 2009.

Two-Wire Layered Heater System. A hot runner nozzle heater system is provided with a layered heater in communication with a two-wire controller, wherein a resistive layer of the layered heater is both a heater element and a temperature sensor. The two-wire controller thus determines temperature of the layered heater using the resistance of the resistive layer and controls heater temperature through a power source.

EP 1692920: Fennewald Kenneth F., Mcdowell William A. III, Ptasienski Kevin, and Steinhauser Louis P. Company: Watlow Electric Mfg Co. Issued: June 3, 2009.

Wear Resistant Thermal Spray Coating. Problem to be solved: To provide a wear resistant thermal spray coating which has improved wear resistance, seizure resistance, initial fitness or the like in the sliding part, and can be applied to the inside face of the cylinder bore of an engine. Solution: The thermal spray coating has a poly-phase mixed structure where a soft phase (graphite) is dispersed into an Al-Si-based alloy, or a hard phase (chromium oxide or chromium carbide) and a soft phase (graphite) are simultaneously dispersed therein. In the method of producing the coating, an atmospheric plasma spraying method is used.

JP 4247882: Azuma Makoto, Niimi Akio, and Mori Takashi. Company: Kawasaki Heavy Ind Ltd. Issued: April 2, 2009.

Wear Resistant Thermal Spray Coating. Problem to be solved: To provide a wear resistant thermal spray coating which has improved wear resistance, seizure resistance, initial fitness or the like in the sliding part, and can be applied to the inside face of the cylinder bore of an engine. Solution: The thermal spray coating has a poly-phase mixed structure where a soft phase (graphite) is dispersed into a sprayed coating essentially consisting of Fe and Mo. Alternatively, the sprayed coating has a poly-phase mixed structure where a hard phase (chromium oxide or chromium carbide) is dispersed into a sprayed coating essentially consisting of Fe and Mo. In the method of producing the coating, an atmospheric plasma spraying method is used.

JP 4281368: Azuma Makoto, Niimi Akio, and Mori Takashi. Company: Kawasaki Heavy Ind Ltd. June 17, 2009.

Diagnostics and Characterization

Method for Preparation of Test Bodies. The invention relates to a method for preparation of test bodies for analysis of porous, preferably thermally sprayed, surface layers, which are incorporated by casting in plastic. The method according to the invention is carried out by placing one or more test pieces of the surface layer in a mould introduced into a vacuum chamber, the pressure of which is lowered, pouring a ready-mixed, liquid casting resin into the mould containing the test pieces, again letting the air in into the chamber, lifting the test pieces out of the casting resin and allowing excess of casting resin to drip from the test pieces, and after that they are placed in a mould cavity of a hot moulding press, filling said mould cavity together with the test pieces with a pulverized resin, and applying pressure and heat to the mould cavity for a predetermined period of time, whereupon the test body is ready to be taken out and lapped.

JP 4271870: Stalberg Sven-Olof. Company: Volvo Aero Corp. Issued: June 3, 2009.

Feedstock

Coating Powder and Method for Its Production. The invention relates to a coating powder and method for its production. Said powder can be used in many technical fields, specially in machine and vehicle construction in chemical and petro-chemical installations. This coating powder has a hard-metal-like microstructure and consists of two cubic hard material phases, each of them representing a nucleus-external surface structure of a hard material particle. The hard material phase in the nucleus contains mostly Ti and C and the hard material phase in the external surface mostly Ti, a second metal and C, which are embedded in a binder phase containing at least one or more elements such as Ni, Co and Fe. According to the invention, said coating powder is characterized by the fact that no additional alloying element exists either in the hard material phase, in the binder phase or in both phases simultaneously. According to the invention, the coating powder is produced by crushing and mixing and homogenizing the individual hard materials and the metal powder in an aqueous suspension in a

ball triturator, which are later on granulated, sintered and processed using a grinding technique.

JP 4282767: Berger Lutz-Michael, Nebelung Manfred, Vuoristo Petri, and Maentylae Tapio. Company: Fraunhofer Ges Forschung E.v. Issued: June 24, 2009.

Metal Oxides Prepared by Flame Spray Pyrolysis. Described is a method for the production of metal oxides, in particular mixed metal oxides such as ceria/zirconia, and metal oxides obtainable by said method. Due to high enthalpy solvents with a high carboxylic acid content said metal oxides have improved properties. For example ceria/zirconia has excellent oxygen storage capacity at high zirconium levels up to more than 80% of whole metal content.

CN 100475688: Stark Wendelin J., Maedler Lutz, and Pratsinis Sotiris E. Company: Eidgenoess Tech Hochschule Zurich. Issued: April 8, 2009.

Plasma Spheroidized Ceramic Powder. Thermal spray powders suitable for application of a thermal barrier coating on a substrate can be obtained by plasma spraying a chemically homogeneous zirconia stabilized in the tetragonal form using a stabilizing oxide such as yttria to obtain a powder comprising substantially spherical hollow zirconia particles with sizes less than about 200 μm.

CN 100478487: Wallar Howard. Company: Saint Gobain Ceramics. Issued: April 15, 2009.

Production Method of Tungsten Carbide Base Ball Shaped Thermal Spray Coating Powder. A process for preparing the WC-based spherical powder for thermospray coating includes such steps as proportionally mixing WC, Co or mixture of Co and Cr, hexane and paraffin wax, wet grinding, spray drying, granulating, sieving, sintering under protection of H_2, and classifying.

CN 100500336: Shi Jianhua, Yin Gang, Li Weiqin, He Xianfeng, and Cao Wanli. Company: Zigong Hard Alloy Co Ltd. Issued: June 17, 2009.

Solid Lubricant Agglomerates and Method for Producing Same for Coating Applications. The production of solid lubricant agglomerates by combining solid lubricant powder, an inorganic binder, other fillers if optionally desired, and a liquid to form a mixture, and driving off the liquid to form dry agglomerates which are subsequently classified by size or milled and classified by size to yield agglomerates of a desired size range. These agglomerates are then treated to stabilize the binder, thereby strengthening the binder and rendering it nondispersible in the liquid. The undesired size ranges can be readily recycled because the agglomerates with untreated binder can be reprocessed, thereby promoting high recovery rates.

CN 100482775: Hajmrle Karel and Walkhouse William. Company: Sulzer Metco Canada Inc. Issued: April 29, 2009.

Spray Powder for Manufacturing by Thermal Spraying of a Thermal Barrier Coating Being Stable at High Temperatures. Spray powder comprises particles forming an agglomerate-like micro-structure formed by a number of adhering grains. The grains consist of functional materials. An additive is formed on the surfaces of the functional material grains in the boundary zones. The additive exerts a limiting or biding action. Independent claims are also included for: (a) process for the production of a spray powder; and (b) coated substrate having a thermal barrier coating.

CA 2448016: Damani Rajiv J. and Honegger Kaspar. Company: Sulzer Markets and Technology. Issued: April 14, 2009.

Spray Powder, Thermal Spraying Process Using It, and Sprayed Coating. A spray powder which has a particle size of from 6 to 63 μm and which comprises from 75 to 95 wt.% of a ceramic phase made of a WC powder and at least one chromium carbide powder selected from the group consisting of Cr_3C_2, Cr_7C_3 and $Cr_{23}C_6$, and from 5 to 25 wt.% of a metal phase made of a Ni or Ni-based alloy powder, wherein the mean particle size of primary particles of the WC powder constituting the ceramic phase is from 5 to 20 μm, and the mean particle size of primary particles of the chromium carbide powder is from 1 to 10 μm.

CA 2337322: Itsukaichi Tsuyoshi and Osawa Satoru. Company: Fujimi Inc. Issued: April 21, 2009.

Thermal Spray Particles and Sprayed Components. Rare earth-containing compound particles of polyhedral shape having an average particle diameter of 3-100 μm, a dispersion index of up to 0.5, and an aspect ratio of up to 2 can be thermally sprayed to form an adherent coating, despite the high melting point of the rare earth-containing compound. A sprayed component having the particles spray coated on a substrate surface is also provided.

JP 4273292: Kaneyoshi Masami and Maeda Takao. Company: Shinetsu Chemical Co. Issued: June 3, 2009.

Thermal Spraying Powder and Method of Forming a Thermal Sprayed Coating Using the Same. The present invention relates to a thermal spraying powder capable of reliably allowing the achievement of a thermal sprayed coating having superior characteristics. A thermal spraying powder according to a first embodiment of the invention includes a predetermined amount of each of molybdenum, boron, cobalt, and chromium. The total content of molybdenum, boron, cobalt, and chromium in the thermal spraying powder is no less than 95% by weight. The primary crystal phase of the thermal spraying powder is multi-element ceramics containing at least one of cobalt and chromium along with molybdenum and boron. A thermal spraying powder according to a second embodiment of the invention includes a predetermined amount of each of molybdenum, boron, nickel, and chromium. The total content of molybdenum, boron, nickel, and chromium in this thermal spraying powder is no less than 95% by weight. The primary crystal phase of this thermal spraying powder is multi-element ceramics containing at least one of nickel and chromium along with molybdenum and boron. The present invention relates to a thermal spraying powder capable of reliably allowing the achievement of a thermal sprayed coating having superior characteristics.

CN 100476014: Itsukaichi Tsuyoshi and Osawa Satoru. Company: Fujimi Inc. Issued: April 8, 2009.

Spraying Systems and Methods

A Method for Feeding Liquid to a Flame Spraying Apparatus. A method and a liquid feeding device for feeding liquid in a flame spraying apparatus that is arranged for treating an optical fiber structure, as well as a flame spraying apparatus in which liquid feeding is

arranged according to the invention. Liquid is supplied to an unpressurized space in a pressure generating part substantially in a constant flow. In the pressure generating part the pressure of liquid is generated by means of gravity influencing the liquid, and the pressurized liquid is arranged to be supplied to the flame spraying at a substantially constant pressure and at a constant flow rate.

EP 1596992: Saerkilahti Simo and Tammela Simo. Company: Liekki Oy. Issued: April 8, 2009.

Arc Thermal Spray Gun Extension with Conical Spray. In a two-wire arc spray extension two metal wires are guided into contact, and a gas cap is affixed to a gun body. The feeding wires receive an arc current to effect an arc and thereby molten metal at the wire tips. The gas cap has a plurality of orifices therein that receive pressurized gas to generate gas jets. The orifices are disposed with substantially equal spacing arcuately such that the jets are directed with a radially inward component toward the tips to effect atomization of the molten metal into a spray stream. The orifices have axes that are offset forwardly and tangentially from radial so as to create a vortex flow such that the spray stream is effected in the form of a conical fan. Insertion of the spray stream centrally into a hole can effect a coating circumferentially on an inside surface of the hole.

EP 1034845: Benary Raphael. Company: Sulzer Metco US Inc. Issued: May 6, 2009.

Cold Gas Dynamic Spraying of High Strength Copper. A process for forming an article, such as a combustion chamber liner, comprises the steps of providing a mandrel formed from a material, such as an aluminum containing material, having a net shape of the article to be made, depositing a powdered metal material onto the mandrel without melting the powdered metal material, and removing the material forming the mandrel to leave a free standing monolithic article. In a preferred embodiment of the present invention, the powdered metal material comprises powdered GRCop-84. Alternatively, the powdered metal material may be GRCop-42.

US 7553385: Haynes Jeffrey D. Company: United Technologies Corp. Issued: June 30, 2009.

Cold Gas Spraying Method. The invention relates to a method for coating a workpiece by means of cold gas spraying. Said method is carried out using a cold gas spray nozzle which generates a particle jet that is directed onto the surface. Additional energy is introduced into the layer that is being formed by means of an electromagnetic energy source, e.g. a laser, while the energy introduced into the particles by the cold gas spray nozzle also contributes to forming the layer. The cold spraying process can be used flexibly as a result of the additional activation by means of electromagnetic radiation. Moreover, layers having a complicated structure, e.g. strip conductors, can be created with the aid of the laser without further processing. The invention also relates to a coating unit which comprises a generator for electromagnetic radiation in addition to the cold gas spray nozzle and is therefore suitable for carrying out the disclosed method.

DE 102005005359: Jensen Jens Dahl, Krueger Ursus, and Ullrich Raymond. Company: Siemens AG. Issued: May 7, 2009.

Cold Spray Apparatus Having Powder Preheating Device. A cold spray apparatus having a powder preheating device, capable of obtaining high deposition rate and excellent coating layer under the same spray processing conditions by preheating coating powder before a coating process. Also, a manufacturing method of nano-structured super-high hardness WC-Co coating having high abrasive wear resistance and fracture toughness obtained by spraying WC-Co powder using the cold spray apparatus. In the cold spray apparatus, a gas controller controls gas supply amount of main gas and residual gas (gas that is not supplied toward the main gas), and a gas heater heats the main gas supplied under the control of the gas controller. A powder feeder receives the residual gas under the control of the gas controller and supplies a coating powder together with the residual gas. A powder preheating device preheats the coating powder supplied from the powder feeder, and a mixing chamber mixes the heated main gas with the preheated coating powder. A temperature controller adjusts temperature by controlling the powder preheating device and the gas heater, and the coating powder mixed in the mixing chamber is sprayed through a nozzle.

CN 100478078: Kim Hyung-Jun and Kweon Young-Gak. Company: Res Inst Ind Science & Tech. Issued: April 15, 2009.

Cold Spray Nozzle Built with Polybenzimidazole. A nozzle for use in a cold spray technique has a passageway for spraying a powder material, the passageway having a converging section and a diverging section, and at least the diverging section being formed from polybenzimidazole. In one embodiment of the nozzle, the converging section is also formed from polybenzimidazole.

US 7543764: Haynes Jeffrey D. and Sanders Stuart A. Company: United Technologies Corp. Issued: June 9, 2009.

Electric Arc Spraying Device. Problem to be solved: To provide an electric arc spraying device where thermal spraying wire rods can be fed always at fixed speed, thus uniform spray deposit can be formed. Solution: In the electric arc spraying device provided with wire rod feeders having push feed parts of feeding both thermal spraying wire rods, a thermal spraying gun having a pull feed part of relaying both the thermal spraying wire rods fed from the wire rod feeders, feeding them to the object to be thermal-sprayed, and performing electric arc spraying: and guide tubes of guiding the feed of both the thermal spraying wire rods between each wire rod feeder and the thermal spraying gun, each guide tube has an ordinary inside diameter from the connection side to each wire rod feeder to a prescribed length and has an inside diameter larger than the ordinary one therefrom to the connection side to the thermal spraying gun.

CN 100497719: Arisaka Kohei and Tsujii Hajime. Company: Daihen Corp. Issued: June 10, 2009.

Flame Spraying Apparatus and Use Method Therefor. Problem to be solved: To suppress the formation of molten drops unnecessary in coating for forming a film by spraying a substance, which is brought into a molten or semi-molten state by a heat source, on a substrate. Solution: A flame spraying apparatus is constituted so that a powder of a flame spraying raw material is supplied to the plasma jet of a flame spraying gun from the jet orifice of a powder supply pipe to be melted and the molten powder is sprayed on an

article to be treated to form a film and air piping for ejecting compressed air to the jet orifice of the powder supply pipe from the outside of the powder supply pipe is provided. In more detail, the powder is carried by the flow of a powder supply gas to be supplied to the powder supply pipe from a powder tank through a supply hose to be supplied to the plasma jet of the flame spraying gun from the jet orifice of the powder supply pipe.

JP 4250927: Kunioka Seiya, Takahashi Masashi, Furuki Kazushi, and Nakamura Muneaki. Company: Suzuki Motor Co. Issued: April 8, 2009.

Method and Apparatus for Microplasma Spray Coating a Portion of a Compressor Blade in a Gas Turbine Engine. An apparatus is disclosed for microplasma spray coating a portion of a substrate, such as a gas turbine compressor blade, without masking any portions thereof. The apparatus includes a microplasma gun with an anode, cathode, and an arc generator for generating an electric arc between the anode and cathode. An arc gas emitter injects inert gas through the electric arc. The electric arc is operable for ionizing the gas to create a plasma gas stream. A powder injector injects powdered material into a plasma stream. A localized area of the compressor blade is coated with the powdered material without having to mask the compressor blade.

EP 1652954: Zajchowski Paul H., Shubert Gary, and Blankenship Donn R. Company: United Technologies Corp. Issued: April 22, 2009.

Method and Apparatus for the Application of Twin Wire Arc Spray Coatings. Methods and apparatuses are disclosed for applying a twin wire arc spray composite coating to achieve surface effects on a substrate having predetermined characteristics.

US 7554052: Deem John Gilbert and Coyne Robert Manuel. Company: Applied Materials Inc. Issued: June 30, 2009.

Method for Coating Internal Member Having Holes in Vacuum Processing Apparatus and the Internal Member Having Holes Coated by Using the Coating Method. A coating method for a internal member having holes in a vacuum processing apparatus is provided. The method includes a process (A) of filling small holes of the internal member with padding plugs each of which has a core member made from a metal material and a metal-resin composite layer covering the circumferential surface of the core member, the metal-resin composite layer being a complex consisting of a metal material and a resinous material exhibiting nonconjugative property to a coating film, a process (B) of forming the ceramic coating film on the surface of the internal member by plasma spraying after the process (A) and a process (C) of extracting the padding plugs out of the holes after the process (B). By this coating method, it becomes possible to solve various problems about the technique of filling the holes with the pudding plugs, so that a coating film superior in its quality performance can be produced effectively.

JP 4260450: Takeuchi Jun, Kishida Masaaki, Matsunaga Tadakazu, and Endoh Shosuke. Company: Amagasaki Tokuzaiken Kk, Tokyo Electric Ltd. Issued: April 30, 2009.

Method for Starting Arc Thermal Spraying, and Method for Starting/Stopping Arc Thermal Spraying. Problem to be solved: To provide a method for starting an arc thermal spraying by which the operation for starting or finishing the thermal spraying can be performed by a single hand, a uniform film is deposited on a work by correctly operating a thermal spraying gun while reducing physical fatigue of hands during a thermal spraying work, and it is unnecessary to perform a repair work due to that the thermal spraying is started when a worker depresses a start switch erroneously. Solution: In this method, if the period of time that the worker depresses the start switch to maintain an ON-state is within a predetermined value, the feeds of wire and thermal spraying current are not started, and the ejection of compressed gas is stopped. On the other hand, if the period of time to maintain the ON-state of the start switch is the predetermined value or above, the feeds of the wire and energization of the thermal spraying current are started to start the thermal spraying.

JP 4261263: Nagashima Tetsuya, Tsujii Hajime, Arisaka Kohei, Oonawa Toshio, Kamiyama Tomoyuki, Uchida Masanobu, and Onishi Takanori. Company: Daihen Corp. Issued: April 30, 2009.

Plasma Projection. Plasma spraying, apparatus for plasma spraying, and methods of plasma spraying.

CN 100482847: Rosenflanz Anatoly Z., Celikkaya Ahmet, and Anderson Thomas J. Company: 3M Innovative Properties Co. Issued: April 29, 2009.

Spray Coating Apparatus and Fixtures. A system for applying a sprayed coating includes a spray mechanism operative to spray a liquefied coating material; a target system including a rotatable spray target wheel; and one or more device-holding fixtures configured to be mounted onto the spray target wheel without requiring either an unattached threaded fastener or a locking pin. Preferred embodiments of the system are configured for thermal spray application of Tamper Resistant Coatings (TRCs).

US 7524537: Anderson Curtis Wayne, Reeves Lenard, Heggli Bjarne, and Dowland Thomas William. Company: White Electronic Designs Corp. Issued: April 28, 2009.

Thermal Barrier Coatings and Bondcoats

Catalyst Element Having a Thermal Barrier Coating as the Catalyst Substrate. A combustion catalyst coating applied to the surface of a ceramic thermal barrier coating which is supported by a metal substrate. The microstructure of the thermal barrier coating surface provides the necessary turbulent flow and surface area for interaction of the catalyst and a fuel-air mixture in a catalytic combustor of a gas turbine engine. The temperature gradient developed across the thermal barrier coating protects the underlying metal substrate from a high temperature combustion process occurring at the catalyst surface. The thermal barrier coating deposition process may be controlled to form a microstructure having at least one feature suitable to interdict a flow of fuel-air mixture and cause the flow to become more turbulent than if such feature did not exist.

US 7541005: Campbell Chris, Subramanian Ramesh, and Burns Andrew Jeremiah.

Company: Siemens Energy Inc. Issued: June 2, 2009.

Highly Oxidation Resistant Component. The application discloses an oxidation resistant component having a substrate and protective layer. The protective layer consists of an inner MCrAlY layer contiguous with the substrate and an outer layer. The outer layer either consists at least of the elements Ni and Al and possesses the structure of the phase beta-NiAl or has the composition MCrAlY with an Al content of up to 6.5 wt.% and the structure of gamma -Ni. The protective layer is useful as bond coating in thermal barrier coatings of parts in oxidative hot gas environments, e.g. for gas turbine blades, vanes.

CN 100482864: Quadakkers Willem J. Dr. and Stamm Werner Dr. Company: Forschungszentrum Juelich Gmbh, Siemens A. Issued: April 29, 2009.

Method for Repairing Thermal Barrier Coatings. A method and apparatus for repairing a thermal barrier coating on components in gas turbine engines and the like. The apparatus includes a microplasma spray gun having an anode, cathode, and an arc generator for generating an electric arc between the anode and cathode. The apparatus includes a nozzle for emitting arc gas into the electric arc. The electric arc is operable for ionizing the gas to create a plasma gas stream. A powder injector injects powdered thermal barrier coating material into the plasma gas stream. Defective areas of the thermal barrier coating can be patched on the component without masking the component.

EP 1652955: Zajchowski Paul H., Blankenship Donn R., and Shubert Gary. Company: United Technologies Corp. Issued: May 27, 2009.