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Selected Patents Related to Thermal Spraying

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EP denotes European patent, US denotes United States patent, WO denotes World Intellectual Property Organization application. Due to differences in databases, not all data are available for each patent. The information has the following format: Title, Abstract, Patent number, Inventors, Company, Issued/Filed dates.

Applications

Apparatus for Improving Performance of Electrical Insulating Structures. Removing the electrical field from the internal volume of high-voltage structures, for example, bushings, connectors, capacitors, and cables. The electrical field is removed from inherently weak regions of the interconnect, such as between the center conductor and the solid dielectric, and places it in the primary insulation. This is accomplished by providing a conductive surface on the inside surface of the principal solid dielectric insulator surrounding the center conductor and connects the center conductor to this conductive surface. The advantage of removing the electric fields from the weaker dielectric region to a stronger area improves reliability, increases component life and operating levels, reduces noise and losses, and allows for a smaller compact design. This electric field control approach is currently possible on many existing products at a modest cost. Several techniques are available to provide the level of electric field control needed. Choosing the optimum technique depends on material, size, and surface accessibility. The simplest deposition method uses a standard electroless plating technique, but other metallization techniques include vapor and energetic deposition, plasma spraying, conductive painting, and other controlled coating methods.

US 6783401. M.J. Wilson and D.A. Goerz. Company: The Regents of the University of California. Issued/Filed: Aug 31, 2004/Oct 17, 2001.

Chamber Components Having Textured Surfaces and Method of Manufacture. A domed enclosure wall for a plasma processing chamber is made from a dielectric material having a roughened surface with a roughness average of from about 150 to about 450 μin.. A plasma sprayed ceramic coating is applied on the roughened surface of the dielectric material. The plasma sprayed coating comprises a textured surface having a roughness with an average skewness that is a negative value. When the enclosure wall is used in a plasma processing chamber, sputtered material generated by a plasma formed in a plasma processing chamber has good adherence to the textured surface.

US 6777045. S.-N. Lin, M.D. Menzie, J.F. Sommers, D.O. Clawson, G.T. Mori, and L.L. Sharp. Company: Applied Materials Inc. Issued/Filed: Aug 17, 2004/June 27, 2001.

Deposited Resistive Coatings. The present invention involves coatings deposited on a substrate including a layer having a selected resistivity. The resistive layer can serve as a heat source in a variety of applications and can be fabricated using an arc plasma spraying procedure.

US 6762396. R.C. Abbott, G.P. Magnant, G. Corey, and O. Sandven. Company: ThermoCeramiX, LLC. Issued/Filed: July 13, 2004/May 6, 1998.

Making of Self-Supporting Composite Materials. A base element is given a coating by thermal spraying, with an additional material directed onto the surface to be coated using a gas. The compound article is made up of at least one base element and a sprayed layer of another material.

EP 911424. P. Heinrich and H. Kreye. Company: Linde AG. Issued/Filed: Aug 18, 2004/Oct 23, 1998.

Manufacture of Electronics Enclosure Having a Metallized Shielding Layer. Manufacture of an electromagnetic interference (EMI) shielding cover or other enclosure part for housing circuitry of an electronic device. The enclosure part has an exterior surface and an opposing interior surface metallized with an electrically conductive EMI shielding layer. The layer is sprayed onto the interior surface in a molten state and is solidified to form a corrosion-resistant, self-adherent coating.

US 6763576. G.R. Watchko, B.F. Flaherty, M.T. Gagnon, D. Nobbs, S.L. Thornton, Jr., W.H. Dolbier, G.A. Lee, and J.J. Sauer. Company: Parker-Hannifin Corporation. Issued/Filed: July 20, 2004/May 1, 2002.

Method for Connecting a First Object to a Second Object Which Has a Partly Open Structure. Method for connecting a first object to a second object along a common contact surface, wherein the first object comprises at the location of the contact surface a portion for a connecting means to be applied, which portion is accessible along an edge zone of or via at least one opening in the second object, by means of thermal spraying of particles of a material suitable as connecting means onto the first object along the edge zone of respectively via the at least one opening in the second object in a quantity such that in solidified state the deposited material particles form a connection between the first and the second object, in addition to a convector element manufactured according to this method.

US 6759629. M.W. Brieko. Company: Stichting Energieonderzoek Centrum Nederland. Issued/Filed: July 6, 2004/Dec 7, 2001.

Method for Joining Workpieces. A layer or several layers are produced by thermal spraying so that at least a part of a surface of a first workpiece and at least a part of a surface of a second workpiece are covered as a result of an additional powder material directed onto the surfaces to be coated using a gas. The resultant compound workpiece has been produced by the above method.

EP 911423. P. Heinrich and H. Kreye. Company: Linde AG. Issued/Filed: Aug 18, 2004/Oct 23, 1998.

Method for Making Optical Fiber Preform Using Simultaneous Inside and Outside Deposition. A method and apparatus for making optical fiber preforms using simultaneous plasma deposition on the inside and outside surface of a starting tube. A starting tubular member is rotated, CFOT chemicals are selectively injected into the plasma torch, and CFIT chemicals are selectively injected to flow through the hollow of the tube. The plasma torch is traversed along the tubular member to simultaneously deposit soot on the inside and outside surface. The soot on one or both surfaces may be

consolidated into a silica layer as it is deposited. The plasma torch is traversed again to deposit additional soot, and/or consolidate previously deposited soot, on one or both surfaces. The process is repeated until a predetermined amount of silica is formed on the tubular member. The tubular member is then collapsed. Optionally, additional plasma deposition is performed during or after the collapsing.

US 6769275. M.I. Guskov, E.B. Danilov, W. Hammerle, M.A. Aslami, and D. Wu. Company: FiberCore, Inc. Issued/Filed: Aug 3, 2004/March 15, 2002.

Method of Manufacturing a Permanent Magnet Using Kinetic Spray. A method of manufacturing a permanent magnet by the steps of preparing an admixture of magnetic material and binder material, the admixture material having a particle size of less than 325 mesh. Then heating a carrier gas to a temperature substantially below the melting point of either component of the admixture. The admixture is introduced into the carrier gas and the admixture is sprayed atop a ductile carrier. The admixture adheres to the carrier and forms a solid permanent magnet. An electric field is applied to the sprayed admixture to create a permanent magnetic moment.

US 6773763. F. Leonardi, J.M. Ginder, and R.C. McCune. Company: Ford Global Technologies, LLC. Issued/Filed: Aug 10, 2004/July 29, 2002.

Method for Producing a Composite Coating. The invention relates to methods for producing a coating by spraying a molten material and can be used for different branches of chemistry, machine building, power engineering, and metallurgy. The inventive composite coating can be used in the form of a substrate for applying various coatings, for example polymer coatings and for impregnation with various compounds including catalytic compounds. The aim of said invention is making it possible to produce a coating that has higher technical and operation characteristics such as adhesive strength and a free surface value than the actually known technical level, thereby making it possible to produce a coating having a higher quality and reliability. For this purpose, a composite powder provided with a hydrotalcite-type coating is added to the coating composition as a material ensuring the development of the coating microstructure. The qualitative and quantitative composition of the compound is also disclosed. Said coating is deposed to a metal or ceramic substrate, mechanically processed and afterwards is heat-treated by sintering. A method for heat-treating and the operation modes thereof are also disclosed.

WO 4079035. A.P. Khinsky. Issued/Filed: Sept 16, 2004/March 6, 2003.

Method of Producing a Heat Exchanger. A heat exchanger, characterized in that Al or Al alloy tubes, each having a thermally Zn-sprayed layer formed on the surface of it, and having a brazing filler metal layer formed on said thermally Zn-sprayed layer using a powdery brazing filler Al alloy composed of 5 to 60 wt.% of Si and the balance of Al and unavoidable impurities, are combined with and brazed to an Al or Al alloy header having a brazing filler metal layer formed using a powdery brazing filler Al alloy composed of 5 to 60 wt.% of Si and the balance of Al and unavoidable impurities. The tubes and the header are strongly bonded to each other, and Zn is uniformly diffused and distributed. So, the heat exchanger shows good corrosion resistance.

EP 1287934. H. Yasunori, W. Akira, and T. Ken. Company: Mitsubishi Aluminium Kabushiki Kaisha. Issued/Filed: July 28, 2004/July 9, 2002.

Process and Apparatus for the Manufacture of a Sputtering Target. A process for the manufacture of sputtering target comprises the steps of 1) providing a substrate; 2) plasma melting of a material selected to form the sputtering target, yielding droplets of molten material; and 3) deposition of the droplets onto the substrate, yielding a sputtering target comprising the coated layer of the material on the substrate. In some applications, it might be preferable that the substrate be a temporary substrate and 4) to join the coated temporary target via its coated layer to a permanent target backing material; and 5) to remove the temporary substrate, yielding a sputtering target comprising the coated layer of the material on the permanent target backing material. The plasma deposition step is carried out at atmospheric pressure or under soft vacuum conditions using, for example, d.c. plasma spraying, d.c. transferred arc deposition, or induction plasma spraying. The process is simple and does not require subsequent operation on the resulting target.

WO 4074540. M.I. Boulos and J.W. Jurewicz. Company: Tekna Plasma Systems Inc. Issued/Filed: Sept 2, 2004/ February 23, 2004.

Process for the Manufacturing of Ceramic-Matrix Composite Layers. Process for the manufacturing of ceramic-matrix composite layers resistant to very high temperatures, comprising the steps of: preparing the powders for the feeding of the deposition plant by wet mixing of the ceramics constituting the material in form of fine powders and atomizing the suspension in the presence of a hot air jet; and depositing by plasma thermal spraying with an inert gas flow and with a >30 kPa pressure in a deposition chamber. This process forms composite layers having a very high resistance, apt to be employed as coatings for vehicles, of the type destined to reenter Earth atmosphere from outer space and to be launched again therein.

US 6761937. M. Tului and T. Valente. Company: Centro Sviluppo Materiali S.p.A. Issued/Filed: July 13, 2004/March 12, 2002.

Screw for a Plastics Processing Machine, and Method of Regenerating a Screw. A screw for a plastics processing machine includes a screw body made of a base material, which is no longer useful as a consequence of wear. A single-ply or multi-ply buffer layer made of magnetically conductive metallic material is applied onto the crest of the screw body by means of a thermal spraying process, and a wear-reducing coating made of molybdenum or a molybdenum-containing alloy and applied onto the buffer layer by means of a thermal spraying process This provides a simple way of ensuring that the regenerated screw has a long service life and is resistant to heavy loads.

US 6786630. A. Haberer. Company: Krauss-Maffei Kunststofftechnik GmbH. Issued/Filed: Sept 7, 2004/May 10, 2002.

Thermally Sprayed Chromium Nitride Coating. The present invention relates to a method including thermal spraying a chromium nitride coating material on to an article. The chromium nitride may be in a powder form before thermal spraying. In one aspect, the thermal spraying includes melting the coating material, propelling the molten coating material toward the article to be coated, and coating the article with the molten coating material. In another aspect, the coated article is one or more piston rings.

US 6780474. T.J. Smith and T. Stong. Company: Dana Corp. Issued/Filed: Aug 24, 2004/Aug 26, 2002.

Thermally Sprayed, Flexible Magnet with an Induced Anisotropy. Disclosed is a process for making a flexible magnet with an induced anisotropy, and in particular to a process for making a flexible anisotropic magnet by thermal spraying in the presence of an applied magnetic field. The method may be used to fabricate a substrate having a flexible anisotropic magnetic coating or a free-standing anisotropic flexible magnet.

US 6773765. R.J. Gambino, D. Shin, and J.A. Brogan. Company: The Research Foundation of State University of New York. Issued/Filed: Aug 10, 2004/Nov 4, 1999.

Wear and Erosion Resistant Alloys Applied by Cold Spray Technique. Particles of the wear alloy coating material are directed toward a target surface of the substrate at a velocity sufficiently high for the particles to deform and to adhere to the target surface. The size and composition of the particles may be varied during the cold spray process to produce a coating with a varying property across the depth of the coating. Particles of the wear alloy material may be applied by cold spraying along with particles of a second material such as a lubricant or a ceramic material. For Group 5 hardfacing materials, the size and distribution of the embedded carbide nodules may be controlled by controlling the selection of the carbide particles being sprayed. The cold spray process permits a wear alloy coating to be applied proximate a brazed joint or over a directionally stabilized or single crystal material without degrading the underlying material.

US 6780458. B.B. Seth and G.P. Wagner. Company: Siemens Westinghouse Power Corporation. Issued/Filed: Aug 24, 2004/Aug 1, 2002.

Wear-Resistant Screen. A method of manufacturing a screen used to block the passage of particulate material in a gas flow path is disclosed. A screen substrate, typically comprising a steel mesh, grate, or perforated plate, is coated by thermal spraying to apply a coating comprising a relatively soft metallic base material and a hard phase in the base material. Various feedstock materials for the thermal spraying process are disclosed. Preferably, the coating is applied by providing a number of spray heads, each of which is inclined relative to the plane of the screen at an angle between 15 and 45°, so that a greater than 180° coating of each portion of the screen is achieved. The resulting screens have application in exhaust systems of fossil-fuel-fired plants, upstream of a selective catalytic reduction (SCR) system.

WO 4079034. I. Hall and C.M. De Villiers. Company: Metalspray Intl. L.L.C. Issued/Filed: Sept 16, 2004-/March 5, 2004.

Diagnostics and Characterization

Method for Monitoring Plasma or Flame-Spray Processes. A method for measuring characteristic properties of a plasma beam in a thermal spraying process, wherein the spraying materials are fed into the plasma and the luminous radiation emitted by the plasma is reproduced on optical fibers. The luminous radiation is reproduced on the one end of the optical fibers arranged in a one-dimensional or two-dimensional array. Spectral analysis of the luminous radiation transmitted in the optical fiber is accomplished with a spectrometer arranged at the other end of an optical fiber. The frequency spectrums are analyzed in a processor to determine the contemporaneous condition of the spraying process.

US 6797939. E. Bayer, J. Hoschele, S. Schneiderbanger, and J. Steinwandel. Company: MTU Aero Engines GmbH/DaimlerChrysler AG. Issued/Filed: Sept 28, 2004/Aug 16, 2002.

Portable Laser Plasma Spectroscopy Apparatus and Method for in Situ Identification of Deposits. A portable laser plasma spectroscopy (LPS) system and process is provided for performing in situ, near-real time, remote elemental analysis, and identification of deposits or other foreign material found on surfaces of machine parts, such as turbine compressor blades or the like, wherein identification of the elemental constituents of a particular deposit is obtained without incurring significant ablative damage to the machine part substrate material underlying the deposit.

US 6762836. P. Benicewicz, A.J. Travaly, P. Wu, and E. Rozier. Company: General Electric Company. Issued/Filed: July 13, 2004/May 22, 2002.

Feedstock

Glassy-Crystalline Material with Low Solubility and Process of Preparing the Same. The invention refers to a material that is chemically long-term stable in a neutral or slightly acid environment and that can be used both as bioactive bone replacement material, for example, in the form of a coating applied onto metallic prosthesis sticks by thermal spraying, and as substrate material in biotechnology, for example, in the form of a ceramic sheet. According to the invention, said material comprises 15 to 45 wt.% CaO, 40 to 45 wt.% P_2O_5, 10 to 40% wt.% ZrO_2 and fluoride, said material further comprises two crystalline phases being apatite and calcium zirconium phosphate, and a secondary glass phase. Said material has a very high chemical long-term stability, compared to known materials which can also be produced by means of a melting process.

US 6767854. G. Berger and U. Ploska. Company: Bam Bundesanstalt fuer Materialforschung und Pruefung. Issued/Filed: July 27, 2004/June 13, 2002.

Method for Producing Spraying Material. When a Cr-Fe-base alloy, preferably a Cr-Fe-base alloy having a Cr content of about 60 to about 95 mass% is subjected to heat treatment at about 500 to about 1300 °C, and subsequently to grinding treatment by use of an impact mill, grindability of the Cr-Fe-base alloy is improved, and running cost can be reduced. In addition, the resultant powdery thermal spraying material exhibits stable fluidity during spray coating, and thus a uniform coating can be formed.

US 6797080. M. Mori, N. Komabayashi, and H. Morimoto. Company: Showa Denko Kabushiki Kaisha. Issued/Filed: Sept 28, 2004/July 9, 2002.

Nanostructured Carbide Cermet Powders by High-Energy Ball Milling. A method for the synthesis of method for the manufacture of carbide cermet powders comprises high-energy ball milling a mixture of precursor powders and a carbon source, followed by annealing the milled powder mixture. The precursor powders are selected from materials suitable for the formation of cermets, for example Si, Ti, Th, Hf, V, Cr, W, Ta, Nb, and Zr-containing materials. The precursors further include a source of C. Tungsten cobalt carbide powders produced by this method are submicron-sized (0.2-0.4 μm) with internal nanograins (10-40 nm in diameter).

US 6793875. L.L. Shaw, R. Ren, and Zh. Yang. Company: The University of Connecticut. Issued/Filed: Sept 21, 2004/Aug 31, 2000.

Thermal Spray Composition and Method of Deposition for Abradable Seals. A thermal spray composition and method of deposition for abradable seals for use in gas turbine engines, turbochargers, and steam turbines. The thermal spray composition comprises a mixture of metal-clad solid lubricant particles and unclad solid lubricants particles for producing an abradable seal used in the compressor section of gas engines, aircraft engines, radial compressors, and the like. The metal is selected from alloys of Ni, Co, Cu, Fe, and Al, preferably Ni alloys, and the solid lubricant is at least one of hexagonal boron nitride, graphite, calcium fluoride, lithium fluoride, and molybdenum disulfide, preferably hexagonal boron nitride or hexagonal boron nitride and graphite.

WO 4065652: K. Hajmrle and P. Fiala. Company: Sulzer Metco (Canada) Inc. Issued/Filed: 2004-08-05/2003-12-17.

Thermal Spray Rare Earth Oxide Particles, Sprayed Components, and Corrosion-Resistant Components. Rare earth oxide particles having an average particle diameter of 3 to 20 μm, a dispersion index of up to 0.4, and an aspect ratio of up to 2 are suitable for thermal spraying. Despite their high melting point, the rare earth oxide particles of high purity can form an adherent coating by thermal spraying.

US 6767636. Y. Takai, T. Maeda, and T. Tsukatani. Company: Shin-Etsu Chemical Co., Ltd. Issued/Filed: July 27, 2004/March 21, 2002.

Spraying Systems and Methods, Post-treatment

Apparatus and Method for Solution Plasma Spraying. The apparatus for the thermal spray delivery of a precursor solution comprises a first solution reservoir, a second solution reservoir, singular or multiple atomizing liquid injector(s) disposed in fluid communication with the reservoirs, a flame source configured to direct a spray from the atomizing liquid injector to a substrate, and a thermal control device disposed in thermal communication with the substrate. The method of depositing a precursor solution at a substrate to form a coating comprises maintaining a substrate at a preselected temperature, delivering the precursor solution from a reservoir bank, atomizing the precursor solution, injecting the atomized precursor solution into a flame, and directing the flame to the substrate.

WO 4063416. X. Ma, S.P. Murphy, and J.D. Roth. Company: Inframat Corp., US Nanocorp, Inc., University of Connecticut. Issued/Filed: July 29, 2004/Jan 12, 2004.

Improved Plasma Transferred Wire Arc Thermal Spray Apparatus and Method. A plasma transferred wire arc thermal spray apparatus is described for applying a coating to a surface. The apparatus comprises a cathode having a first negative electrical potential, a nozzle generally surrounding a free end of said cathode in spaced relation having a restricted orifice opposite said cathode free end, said nozzle having a second positive electrical potential, a source of plasma gas directing plasma gas into said nozzle surrounding said cathode and exiting said restricted nozzle orifice, and a wire feed continuously directing a free end of wire feedstock opposite said restricted nozzle orifice and said wire feedstock having the same second positive electrical potential as said nozzle, said apparatus thereby establishing a plasma transferred-arc between said wire feedstock free end and said cathode melting said wire feedstock free end and said plasma gas exiting said restricted nozzle orifice atomizing melted feedstock and propelling atomized melted wire feedstock toward said surface, thereby coating said surface. A method of coating a surface with a metallic coating is also disclosed.

EP 958061. D.R. Marantz, K.A. Kowalsky, J.R. Baughman, and D.J. Cook. Company: Ford Global Technologies, LLC. Issued/Filed: July 7, 2004/Dec 29, 1997.

Methods and Apparatus for Spray Forming, Atomization, and Heat Transfer. The present invention is directed to methods and apparatus that use electrostatic and/or electromagnetic fields to enhance the process of spray forming preforms or powders. The present invention also describes methods and apparatus for atomization and heat transfer with nonequilibrium plasmas. The present invention is also directed to articles, particularly for use in gas turbine engines, produced by the methods of the invention.

US 6772961. R.M. Forbes Jones, R.L. Kennedy, H.G. Conrad, T. Szylowiec, W. Conrad, R.S. Phillips, and A.R.H. Phillips. Company: ATI Properties, Inc. Issued/Filed: Aug 10, 2004/June 18, 2001.

Method of Treating Metal Components. A method of forming a metal product. The attributes of a final workpiece product are selected. An appropriate substrate composition is determined depending on the selected attributes. A workpiece substrate is formed to near finished dimensions. An appropriate coating material composition is determined depending on the selected attributes. The workpiece substrate is prepared for a high-density coating process. The high-density coating process, such as HVOF thermal spray, is performed to coat the workpiece substrate with the coating material. The coating material is built-up to a thickness effective to obtain desired finished dimensions after performing a hot isostatic pressing treatment. The appropriate hot isostatic pressing treatment parameters are determined. The hot isostatic pressing treatment is performed on the coated workpiece substrate to obtain a metal product having the desired finished dimensions and diffusion bonding between the coating material and the workpiece substrate.

EP 968316. J.E. Arnold. Company: J.E. Arnold. Issued/Filed: Aug 11, 2004/Dec 18, 1997.

Systems and Methods for Coating Conduit Interior Surfaces Utilizing a Thermal Spray Gun with Extension Arm. In one embodiment, a spray gun configured to apply a coating is attached to an extension arm that may be inserted into bore of pipe. The spray gun may be a thermal spray gun adapted to apply a powder coating. An evacuation system may be used to provide a volume area of reduced air pressure for drawing overspray out of the pipe interior during coating. The extension arm as well as the spray gun may be cooled to maintain a consistent temperature in the system, allowing for more consistent coating.

WO 4071671. K.A. Moore and R.A. Zatorski. Company: Bechtel BWXT Idaho, LLC. Issued/Filed: Aug 26, 2004/Feb 11, 2003.

Thermal/Environmental Barrier Coatings and Bondcoats

Article with Hafnium-Silicon-Modified Platinum-Aluminum Bond or Environmental Coating. An article such as a gas turbine blade or vane has a superalloy substrate, and a coating system deposited on the substrate. The coating system includes a protective layer overlying the substrate, and, optionally, a ceramic thermal barrier coating layer over-

lying the bond coat. The protective layer has an uppermost layer with a composition including Pt, Al, and from about 0.14 to about 2.8 at.% Hf and from about 2.7 to about 7.0 at.% Si, with the atomic ratio of Si:Hf being from about 1.7:1 to about 5.6:1.

EP 1010774. D.J. Rigney, R. Darolia, and W.S. Walston. Company: General Electric Co. Issued/Filed: Aug 18, 2004/Oct 7, 1999.

High-Temperature Spray Coated Member and Method of Production Thereof. In order to advantageously solve problems such as lowering of the productivity, contamination of alloy coating due to the adoption of different metal, increase of the cost due to the adoption of different coating process, a coating of MCrAlX alloy is directly formed on a substrate surface of a member exposed to a high temperature at a thickness of 10 to 300 μm through atmospheric plasma spraying process in air or flame spraying process (including low-velocity flame spraying process, high-velocity flame spraying process) and thereafter the same MCrAlX alloy is applied thereonto at a thickness of 100 to 800 μm through low-pressure plasma spraying process in a nonoxidizing atmosphere.

EP 913496. Y. Harada, T. Suizu, and T. Teratani. Company: Tocalo Co. Ltd. Issued/Filed: Sept 29, 2004/March 23, 1998.

Method of Depositing a Coating on Silicon-Base Ceramic Composites. A process of depositing a coating system suitable for use as an environmental barrier coating on various substrate materials, particularly those containing Si and intended for high-temperature applications such as the hostile thermal environment of a gas turbine engine. The process comprises depositing a first coating layer containing mullite, and preferably a second coating layer of an alkaline earth aluminosilicate, such as barium-strontium-aluminosilicate (BSAS), by thermal spraying while maintaining the substrate at a temperature of 800 °C or less, preferably 500 °C or less, by which a substantially crack-free coating system is produced with desirable mechanical integrity.

US 6787195. H. Wang, Y.-Ch. Lau, I. Spitsberg, and A.T. Henry. Company: General Electric Co. Issued/Filed: Sept 7, 2004/Feb 3, 2003.

Method for Forming a Carbon Deposit Inhibiting Thermal Barrier Coating for Combustors. A method for forming a carbon deposit inhibiting thermal barrier coating for an internal element or component of a gas turbine engine. Such coating includes a layer of thermal barrier material coated onto the surface of an engine component that will be exposed to the flow of burning engine gases. Such coating further includes a layer of carbon deposit inhibiting material coated on top of the layer of thermal barrier material.

US 6797332. T.E. Strangman, D. Narasimhan, J.P. Armstrong, and K.R. Karasek. Company: Honeywell International, Inc. Issued/Filed: Sept 28, 2004/Sept 9, 2003.

Oxidation-Resistant and Low Coefficient of Thermal Expansion NiAl-CoCrAlY Alloy. A bond coat composition for use in thermal barrier coatings comprises a NiAl-CoCrAlY matrix containing particles of AlN dispersed therein. The bond coat composition is prepared by cryomilling NiAl and CoCrAlY in liquid nitrogen.

US 6793706. M.G. Hebsur. Company: Ohio Aerospace Institute. Issued/Filed: Sept 21, 2004/Sept 10, 2002.