

## **"State of the art" mailing service**

**Patent News nr. 93 (01-2012)**



### **US20110302960A1: Gemstone cut shape providing a specific optical pattern**

Applicant: -  
Publication: 2011-12-15  
Filed: 2010-06-09  
Status: application

A gemstone cut with a table facet, where the gemstone receives existing light from around the viewer and the facets on the bottom of the diamond effectively reflect the existing light back into the eyes of the beholder in such a manner as to maximize light performance, and to produce a unique and distinct look of light in the form of a Maltese cross under the table facet which can be observed in natural ambient light.

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### **EP2296914B1: A decorative substrate, especially an artificial jewellery stone with a colour effect and method for achieving the colour effect for a transparent substrate**

Applicant: Preciosa, , Czech Republic  
Publication: 2011-12-14  
Filed: 2009-06-01  
Status: granted

A decorative substrate, especially an artificial jewellery stone having a colour effect, formed by a transparent substrate which comprises layers on its back side where the layers are deposited and positioned in the following order from the back side of the substrate: an optically modifying layer with a thickness of 2 to 80 nm, the layer being formed by at least one element or by an oxide from a group including Ge, Si and oxides of Ti, Zr, Nb and Al, which are alternatively doped by further elements, then a reflexion layer formed by at least one metal or by an alloy from a group including Au, Ag, Cu, Al, Cr, Ti, aluminium bronzes and alloys of Au, Ag and Cu and having a thickness ensuring maximum possible reflection of the impingent visible light in dependence on the spectral reflectivity of the material from which the reflection layer is made back into the transparent substrate, then an interposed layer having a thickness of 10 to 100 nm, this layer being formed by at least one metal from a group including Ti, Cr and Cu, and then a layer of a protecting varnish.

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### **WO2011097498A3: Sapphire coated gemstone**

Applicant: Malinowski Jack, United States of America

Publication: 2011-12-29  
Filed: 2011-02-04  
Status: application

The present invention provides a diamond simulant with greater similarity to a diamond than cubic zirconia. The present invention further provides a diamond simulant with durability, hardness, and optical features closer to that of a genuine diamond than previously afforded by other diamond simulants, such as cubic zirconia.

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**RU2434977C1: Procedure for production of diamonds of fantasy yellow and black colour**

Applicant: multiple Russian Federation  
Publication: 2011-11-27  
Filed: 2010-04-16  
Status: patent for invention

Field: metallurgy.

Substance: procedure consists in ion-energy-beam processing diamonds with high power ion beam of inert chemical element of helium with dose of radiation within range from  $0.2 \times 10^{16}$  to  $2.0 \times 10^{17}$  ion/cm<sup>2</sup> eliminating successive thermal annealing.

Effect: production of amber-yellow and black colour of diamond resistant to external factors at significant reduction of material and time expenditures of process of diamond upgrading.

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**RU2434083C1: Procedure for simultaneous production of several faceted valuable stones of synthetic silicon carbide - moissanite**

Applicant: Grannik, Russian Federation  
Publication: 2011-11-20  
Filed: 2010-10-28  
Status: patent for invention

Field: metallurgy.

Substance: procedure consists in simultaneous growth of multitude of work pieces of moissanite crystals in cellular mould of forming graphite, in dividing them to separate crystals, in faceting, grinding and in polishing. Before faceting, grinding and polishing work pieces are first glued on a mandrel, then they are re-glued on a back side.

Moissanite is polished on a ceramic polisher rotating at rate from 200 to 300 rpm with utilisation of diamond powder (spray) with dimension of a grain from 0.125 to 0.45 mcm, facilitating depth of grooves less, than length of light wave of a visible part of spectre. Also, cut and chipped edges of the work piece with defects not suitable for faceting, are crumbled and returned to a stage of growth. Grinding paste with size of a grain 0.25 mcm can be used for grinding.

Effect: increased quality of crystals, increased efficiency due to elimination of cutting operation; reduced expenditures for production and losses of material at cutting during

work piece growth.

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**WO2011148572A1: Device for measuring properties of scatterers, color measuring device for scattered light of gemstones, device for measuring brightness of gemstones, and device for measuring luminescence distribution**

Applicant: Ninomiya Jewelry, Japan  
Publication: 2011-12-01  
Filed: 2011-04-28  
Status: application

A device for measuring properties of scatterers which measures properties of a scatterer from a stereoscopic scattering distribution of the scatterer upon receiving an electromagnetic wave with a certain wavelength distribution is provided. In the device, a scatterer to be measured is placed on a specimen platform; the electromagnetic wave is irradiated onto the scatterer from at least either any one or more directions, or one or more continuous directions of a hypothetical spherical surface having the above-mentioned focal point as its center; scattering waves scattered by the scatterer and reflected off the paraboloidal mirror or projected onto the paraboloidal screen are imaged by the imaging means as planar imaging data; and from thus obtained imaging data, a stereoscopic distribution of the scattering waves generated by the scatterer is obtained so as to measure properties of the scatterer from the distribution result.

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**AT0537011E: Ziersubstrat, insbesondere künstlicher schmuckstein mit farbeffekt, und verfahren zum erzielen des farbeffekts für ein transparentes substrat**

Applicant: Preciosa, Czech Republic  
Publication: 2011-06-22  
Filed: 2006-07-14  
Status: translation of European patent specification

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**US20110315074A1: Single-crystal diamond growth base material and method for manufacturing single-crystal diamond substrate**

Applicant: Shin-Etsu Chemical, Tokyo, Japan  
Publication: 2011-12-29  
Filed: 2011-06-13  
Status: application

An object is to provide a single-crystal diamond growth base material and a method for manufacturing a single-crystal diamond substrate that enable growing single-crystal diamond having a large area and excellent crystallinity and inexpensively manufacturing a high-quality single-crystal diamond substrate.

A single-crystal diamond growth base material on which single-crystal diamond is grown comprises at least: a base substrate consisting of a material having a linear expansion

coefficient smaller than that of MgO and not smaller than  $0.5 \times 10^{-6}/K$ ; a single-crystal MgO layer formed on a face of the base substrate where the single-crystal diamond is grown by a bonding method; and a film constituted of any one of an iridium film, a rhodium film, and a platinum film heteroepitaxially grown on the single-crystal MgO layer.

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**US20110299063A1: Device for measuring properties of scatterers , for color measuring for scattered light of gemstones, for measuring brightness of gemstones, and for measuring luminescence distribution**

Applicant: Ninomiya Jewelry, Japan  
Publication: 2011-12-08  
Filed: 2011-05-10  
Status: application

A device for measuring properties of scatterers which measures properties of a scatterer from a stereoscopic scattering distribution of the scatterer upon receiving an electromagnetic wave with a certain wavelength distribution is provided. In the device, a scatterer to be measured is placed on a specimen platform; the electromagnetic wave is irradiated onto the scatterer from at least either any one or more directions, or one or more continuous directions of a hypothetical spherical surface having the above-mentioned focal point as its center; scattering waves scattered by the scatterer and reflected off the paraboloidal mirror or projected onto the paraboloidal screen are imaged by the imaging means as planar imaging data; and from thus obtained imaging data, a stereoscopic distribution of the scattering waves generated by the scatterer is obtained so as to measure properties of the scatterer from the distribution result.

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**EP1889656B1: Capsule and elements for synthesised diamond production**

Applicant: Instituto de Monocristales, Carmona, Spain  
Publication: 2011-12-14  
Filed: 2005-08-16  
Status: patent specification

The present invention consists in obtaining, with the capsule described, a vertical gradient favorable for diamond growth that prevails over any radial gradient by means of heating discs placed at the ends of the heating area, which implies a considerable control over the growth conditions. More specifically, in regard to the rate of growth, it allows for a better control of the quality of large crystals. Another important novelty is to use a source of carbon with a special design formed by cylindrical and conical hollows (graphite, amorphous carbon, diamond or other) with a solvent metal with a number of gases that are introduced in the capsule.

Also, a nitrogen scavenger is used to avoid the formation of nitrides, carbides and oxides that are harmful for the growth and that as a significant novelty is placed outside the reaction area.

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**US20110310246A1: Modified apparatus and method for assessment, evaluation and grading of gemstones**

Applicant: -  
Publication: 2011-12-22  
Filed: 2009-10-09  
Status: application

An apparatus for assessment, evaluation and grading of gemstones has a stage upon which a gemstone may be supported. The stage is enclosed in a housing that is impervious to light. There is at least one light source located in the housing which is adapted to project incident light onto the gemstone. Means for rotating and tilting the stage so as to vary the orientation of the gemstone to the incident light are also present. A digital camera is located in the housing adjacent the or each light source and is adapted to take images of the gemstone based on reflection and/or refraction of the incident light. The apparatus also includes information processing means for calibrating and analysing the images. The information processing means is programmed with instruction sets for assessing one or more of colour, cut, clarity, scintillation, brilliance, lustre, dispersion and sheen. The gemstone is supported upon the stage by securing means engaging the gemstone at its bottom surface.

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**WO2011146460A1: Production of large, high purity single crystal cvd diamond**

Applicant: Carnegie Institution of Washington, United States of America  
Publication: 2011-11-24  
Filed: 2011-05-17  
Status: application

The invention relates to single crystal diamond with high optical quality and methods of making the same. The diamond possesses an intensity ratio of the second-order Raman peak to the fluorescence background of around 5 or greater.

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**GB2481285A: A method of increasing the toughness or wear resistance of diamond**

Applicant: Element Six, United Kingdom  
Publication: 2011-12-21  
Filed: 2011-06-01  
Status: application

A method is disclosed which comprises selecting a diamond material, irradiating the diamond material to increase toughness and/or wear resistance of the diamond material and processing the diamond material into one or more diamond tool pieces, wherein the diamond material is selected from the group consisting of: a HPHT diamond material having a total equivalent isolated nitrogen concentration in the range 1 to 600 ppm; a CVD diamond material having a total equivalent isolated nitrogen concentration in the range 0.005 to 100 ppm; and a natural diamond material having a total nitrogen

concentration in the range 1 to 2000 ppm; wherein the irradiating comprises controlling energy and dosage of irradiation to provide the diamond material with a plurality of isolated vacancy point defects, the isolated vacancy point defects having a concentration in a range  $1 \times 10^{14}$  to  $1 \times 10^{21}$  vacancies/cm<sup>3</sup>. Also disclosed is the formation of tools from treated diamond material.

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**GB2481284A: A method of increasing the toughness or wear resistance of diamond**

Applicant: Element Six, United Kingdom  
Publication: 2011-12-21  
Filed: 2011-06-01  
Status: application

A method is disclosed which comprises selecting a diamond material, irradiating the diamond material with neutrons to increase toughness and/or wear resistance of the diamond material and processing the diamond material into one or more diamond tool pieces, wherein the irradiating comprises irradiating the diamond material with neutrons having an energy in the range 1.0 keV to 12 MeV, wherein the irradiating comprises controlling energy and dosage of irradiation to provide the diamond material with a plurality of isolated vacancy point defects, the isolated vacancy point defects having a concentration in a range  $1 \times 10^{14}$  to  $1 \times 10^{20}$  vacancies/cm<sup>3</sup>. Also disclosed is the use of the irradiated diamond material to form tools.

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**GB2481283A: A method of modifying diamond for tool applications**

Applicant: Element Six, United Kingdom  
Publication: 2011-12-21  
Filed: 2011-06-01  
Status: application

A method is disclosed which comprises selecting a diamond material; irradiating the diamond material with electrons to increase toughness and/or wear resistance of the diamond material; and processing the diamond material into one or more diamond tool pieces, wherein the irradiating comprises controlling energy and dosage of irradiation to provide the diamond material with a plurality of isolated vacancy point defects, the isolated vacancy point defects having a concentration in a range  $1 \times 10^{14}$  to  $1 \times 10^{22}$  vacancies/cm<sup>3</sup>. Also disclosed is a tool piece incorporating an electron-irradiated diamond material.

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**WO2011157429A1: Method for producing diamond layers and diamonds produced by the method**

Applicant: Universität Augsburg, Germany  
Publication: 2011-12-22  
Filed: 2011-06-16  
Status: application

The present invention relates to a method for producing diamond layers, wherein firstly, in a first growing step, diamond is grown on a growing surface of a (001)-off-axis or a (111)-off-axis heterosubstrate in such a way that a texture width, in particular a polar and/or azimuthal texture width, of a diamond layer produced during the growth decreases with increasing distance from the substrate and then, in a second growing step, diamond is grown in such a way that the texture width of the diamond layer remains substantially constant as the distance from the substrate further increases, (001) and (111) lattice planes of the substrate being inclined by an angle greater than zero with respect to the growing surface.

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**GB2452873B2: Method for diamond surface treatment and device using thin film of diamond**

Applicant: Nat Inst Of Advanced Ind Scien, Japan  
Publication: 2011-12-28  
Filed: 2008-11-20  
Status: granted

Problems: To provide a method for surface treatment of diamond and a device using the thin film of diamond.

Means for solving problems: A method for surface treatment of diamond, characterized by comprising exposing the surface of diamond to UV light containing wavelengths of 172 nm to 184.9 nm and 253.7 nm at an integrated exposure of 10 to 5,000 J/cm<sup>2</sup> in an environment of an atmosphere having an oxygen concentration of 20 to 100% and an ozone concentration of 10 to 500,000 ppm to adsorb oxygen on the surface of diamond.

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**JP2011177883A2: Polishing method for diamond surface**

Applicant: Toyo Seikan Kaisha  
Publication: 2011-09-15  
Filed: 2010-12-28  
Status: published unexamined patent application

Problem to be solved: To provide a polishing method for a diamond surface with less generation of wear powder not only having long life of a polishing member and easy control, and capable of obtaining a surface with high smoothness, but also capable of being also easily applied to polishing of an uneven three-dimensional surface.

Solution: In the polishing method for the diamond surface, the polishing member having a surface made of metal easily reactive with carbon or carburization metal is used, the diamond surface is irradiated with a laser beam prior to polishing of the diamond surface by the polishing member, and subsequent to irradiation of the laser beam, the polishing member is slid/rubbed to a laser beam irradiation part to perform polishing.

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**AT0535630E: Intensiv gefärbter diamant**

Applicant: Element Six, United Kingdom  
Publication: 2011-12-15  
Filed: 2006-06-22  
Status: EP patent valid in at

A method of producing a CVD diamond layer having a high colour, which is suitable for optical applications, for example. The method includes adding a gaseous source comprising a second impurity atom type to counter the detrimental effect on colour caused by the presence in the CVD synthesis atmosphere of a first impurity atom type. The described method applies to the production of both single crystal diamond and polycrystalline diamond.

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**Patent News nr. 94 (02-2012)**



**US20120024010A1: Enhancing the optical characteristics of a gemstone**

Applicant: California Institute of Technology, United States of America

Publication: 2012-02-02

Filed: 2011-10-05

Status: application

Various embodiments described herein comprise a gemstone or other piece of jewelry, which incorporates one or more diffractive optical elements to enhance the fire displayed by the gemstone. In certain embodiments, the diffractive optical element comprises a diffraction grating etched on one or more facets of the gemstone.

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**EP2398349A2: Product improved optical characteristics**

Applicant: Dianscan NV Belgium

Publication: 2011-12-28

Filed: 2010-02-16

Status: application published without search report

Cut product manufactured from semi-precious stone material, more particularly from natural or synthetic diamond has lower part which has number of girdle pavilion facets and number of culet facets

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**EP2398348A2: Cut product, in particular diamond, with improved characteristics and method for manufacturing such a product**

Applicant: Dianscan NV Belgium

Publication: 2011-12-28

Filed: 2010-02-19

Status: application published without search report

Cut product for stone material, has girdle bezel facets which are in twisted position with respect to girdle pavilion facets, in which perpendicular bisectors of bezel facets are not coplanar with perpendicular bisectors of pavilion facets

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**CN202085858U:**

Applicant: -  
Publication: 2011-12-28  
Filed: 2011-03-24  
Status: utility model application

Hidden character pattern type natural fluorescent diamond decoration ornament, has decoration base arranged in non-fluorescent and fluorescent ornament base diamonds that are polyhedral-shaped

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**WO2012004351A1: Improved method for analyzing a gemstone**

Applicant: Octonus Finland, Sivovolenko Sergey Finland  
Publication: 2012-01-12  
Filed: 2011-07-07  
Status: application

Method for analyzing a gemstone, typically for locating an inclusion in a gemstone, comprising: selecting a solid material which is transparent in at least a segment of the visible spectrum or a segment of the infrared spectrum; melting or plasticizing said solid material and immersing the gemstone in said melted or plasticized material such that the gemstone is at least partly covered therein; allowing said melted or plasticized material to become solid such that a solid transparent block is obtained containing the gemstone; analyzing the gemstone through a surface of the transparent solid block using light rays in the visible spectrum or in the infrared spectrum.

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**WO2012001698A1: MULTIPLE DIAMOND PLANNING AND BRUTING MACHINE**

Applicant: -  
Publication: 2012-01-05  
Filed: 2010-09-20  
Status: application

Multiple Diamond planning and Bruting Machine is used to scan the multiple diamond on the single machine so, it reduce the labor and production cost. The invention mainly comprised in two parts; Flat scanner setup, Multi bruit machine wherein flat scanner setup comprises machine frame, camera assembly, line laser, fixture device, X axis and Y axis which is used for the scanning the stone with the help of camera unit capturing images while two different line laser modules throws LASER beams on the stone and generates 3D images of the stone; wherein the multi bruter machine comprises with frame, laser source, galvo, air & LED holder assembly, camera assembly, fixture, X-axis, Y- axis and Z- Axis which used use the data which generated at the time of flat scanner scanning process.

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**US8098369: Systems and methods for the evaluation of scintillation in gemstones**

Applicant: American Gem Society, United States of America  
Publication: 2012-01-17  
Filed: 2008-12-09  
Status: granted

Systems and methods, for the evaluation, grading, and presentation of evaluation results, of the scintillation of gemstones, such as diamonds. Specifically, there are discussed systems and methods for determining when a scintillation event in a gemstone is likely to occur and for mapping such events to a presentation.

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**US8098368: Method for evaluation of a gemstone**

Applicant: Galatea Ltd., Israel  
Publication: 2012-01-17  
Filed: 2006-08-21  
Status: granted

A method of determining the position of inclusions in a gemstone, comprising: (a) placing the gemstone within a material having a refractive index within 0.5, optionally 0.2 or 0.1, of that of the gemstone; (b) illuminating the gemstone and imaging the illuminated gemstone; and (c) determining the position of inclusions based on images of the inclusions in the images.

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**US8095325: System and method for gemstone cut grading**

Applicant: Gemological Institute of America, United States of America  
Publication: 2012-01-10  
Filed: 2009-06-30  
Status: granted

A system for grading the cut of a diamond utilizes a number of appearance metrics to generate scores for a number of cut components that affect cut quality. These cut components include brightness, fire, scintillation, overweight, durability, polish, and symmetry. The cut grading system employs a cut grading algorithm that processes the individual scores obtained for the cut components to generate an overall cut grade for the diamond. The scoring methodology and the cut grading algorithm are designed to emulate actual observation grading such that the overall cut grade represents a fair indication of the cut quality of the diamond. In one practical embodiment, the cut grading system is fully automated and computer-implemented.

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**US8088221: Method and system for diamond deposition using a liquid-solvent carbon-transfer mechanism**

Applicant: -  
Publication: 2012-01-03

Filed: 2011-04-11  
Status: granted

A system and method for growing diamond crystals from diamond crystal seeds by epitaxial deposition at low temperatures and atmospheric and comparatively low pressures. A solvent is circulated (by thermal convection and/or pumping), wherein carbon is added in a hot leg, transfers to a cold leg having, in some embodiments, a range of progressively lowered temperatures and concentrations of carbon via the circulating solvent, and deposits layer-by-layer on diamond seeds located at the progressively lower temperatures since as diamond deposits the carbon concentration lowers and the temperature is lowered to keep the solvent supersaturated. The solvent includes metal(s) or compound(s) that have low melting temperatures and transfer carbon at comparatively low temperatures. A controller receives parameter signals from a variety of sensors located in the system, processes these signals, and optimizes diamond deposition by outputting the necessary control signals to a plurality of control devices (e.g., valves, heaters, coolers, pumps).

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**US20120013350A1: Apparatus for imitating thermal conductivity and electrical resistance of diamonds and their substitutes**

Applicant: -  
Publication: 2012-01-19  
Filed: 2010-07-16  
Status: application

The invention relates to devices which exhibit some physical properties, namely thermal conductivity and electrical resistance of diamonds and their popular imitations, and method for manufacturing and usage of such device. These physical properties of gems are usually used by commercial gem testers for the purpose of distinguishing true diamonds from the fakes. The imitations are made of inexpensive metals, like brass and stainless steel, and conductive plastics, and can replace more costly diamonds and other gems, like moissanite, white sapphire, and others for the purpose of verification of correct operation of gem testing devices.

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**US20120007619A1: Multi-functional precious stone testing apparatus and method thereof**

Applicant: -  
Publication: 2012-01-12  
Filed: 2011-02-16  
Status: application

A multi-functional precious stone testing apparatus includes a portable housing, a testing unit, and an indication unit. The portable housing includes a hand-held casing and a probe casing extended from a front end of the hand-held casing. The testing unit includes a conductive probe having a testing end portion extended out of a tip end of the probe

casing for contacting a testing object to determine a conductivity of the testing object. The indication unit includes a LED light unit received in the hand-held casing for illuminating the testing end portion of the conductive probe during testing, wherein the LED light unit is positioned away from the tip end of the probe casing for preventing heat generated from the LED light unit being transmitted toward the conductive probe to affect an accurate measurement for the conductivity of the testing object.

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#### **US20120007971A1: METHODS AND SYSTEMS OF IMAGING CUT STONES**

Applicant: Dsee Imaging, Israel  
Publication: 2012-01-12  
Filed: 2010-03-11  
Status: application

A method of imaging a cut stone. The method comprises a) identifying an orientation of a cut stone, b) creating a volumetric model of the cut stone according to the orientation, c) capturing a plurality of images of the cut stone from a plurality of viewing angles around the cut stone, d) cropping a plurality of segments depicting the cut stone from the plurality of images using the volumetric model, and e) generating a volumetric image of the cut stone from the plurality of segments.

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#### **CN101733698B: Numerical control gem processor**

Applicant: -  
Publication: 2012-01-11  
Filed: 2009-11-18  
Status: granted patent for invention

The invention relates to a numerical control gem processor. The numerical control gem processor comprises a working platform, a grinding polishing disk motor, a grinding polishing disk, an optical shaft, an optical shaft step motor, a connecting piece, a lifting platform gear, a swing step motor, a supporting arm, an angle step motor, a supporting arm gear, a gem adhesive rod clamp, a swing mechanism gear and an angle gear, wherein the optical shaft step motor, the connecting piece and the lifting platform gear are sequentially arranged on the optical shaft from top to bottom; the swing step motor, the supporting arm and the angle step motor are arranged at the two ends of the connecting piece; the supporting arm gear and the gem adhesive rod clamp are arranged on the end part of the supporting arm; the swing mechanism gear is arranged on the swing step motor; the angle gear is arranged on the angle step motor; the swing mechanism gear is meshed with the lifting platform gear; the angle gear is meshed with the supporting arm gear; the gem adhesive rod clamp is driven by the step motor of the gem adhesive rod clamp; the connecting piece and the lifting platform gear are driven by the optical shaft step motor; and all the step motors are connected with a driver of a numerical control system. The numerical control gem processor can perform all the processes of rough machining, finishing machining and polishing on the facet gem, solves the problem of

positioning precision during production, and has simple structure and easy operation.

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**JP04709088B2:**

Applicant: -  
Publication: 2011-06-22  
Filed: 2006-07-14  
Status: published granted patent

Diamond for decoration, has pavilion that is divided into two pavilions in horizontal-split plane parallel to girdle bottom-horizontal-discharge cross section

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**JP04709087B2:**

Applicant: -  
Publication: 2011-06-22  
Filed: 2006-07-14  
Status: published granted patent

Diamond for two-stage pavilion decoration has X-axis marks of regular octagon vertex of table facet that are set when girdle lower outer periphery is set to a point

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**JP2011144107A2: DIAMOND MATERIAL OF OPTICAL QUALITY**

Applicant: Element Six Ltd  
Publication: 2011-07-28  
Filed: 2011-02-16  
Status: published unexamined patent application

Problem to be solved: To provide a CVD single crystal diamond material suitable for using in an optical device or element or as the optical device or element.

Solution: In the CVD single crystal diamond material exhibiting at least one of the characteristics such as a processability, a mechanical strength, a wear resistance, a chemical inactivity exhibiting a high surface polishing while having a low and uniform birefringence, a uniform and high refringence, a low inductive birefringence or refringence variation as a distortion factor, a low and uniform light absorption, a low and uniform light scattering, a high light (laser) damaging threshold, a high heat conductivity and a high parallelism and flatness, a manufacturing method of the CVD single crystal diamond material includes a step for providing a substrate substantially having no crystal defect, a step for providing a raw material gas, a step for producing a synthesizing atmosphere containing 300 ppb to 5 ppm nitrogen calculated as a molecular nitrogen by dissociating the raw material gas and a step for growing a homoepitaxial diamond on the surface substantially having no crystal defect.

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## **"State of the art" mailing service**

**Patent News nr. 95 (03-2012)**



### **EP2412266A2: Multi-faceted gemstone for multi-stone jewelry item**

Applicant: Firestone Inc., United States of America

Publication: 2012-02-01

Filed: 2010-12-27

Status: application

A gemstone has a front, a back and a bottom. The gemstone comprises a lower pavilion and an upper crown. The crown has a top surface and a pair of depending opposed planar sides. The top surface of the crown has a convex shape such that the top surface arcuately runs in a lateral direction from said front to said back of said gemstone.

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### **US20120047950A1: Single crystal diamond gemstones and methods therefor**

Applicant: Board of Trustees Of Michigan State University, United States of America

Publication: 2012-03-01

Filed: 2011-08-23

Status: application

The disclosure relates to the inclusion of an image embedded in or on a single crystal diamond such that the image is part of the single crystal diamond structure. The disclosed methods use a combination of gemstone deposition processes and patterning processes to create single crystal gemstones with embedded color variations that can create externally visible two-dimensional or three-dimensional images in a seamless single crystal matrix without visible internal lines/interfacial boundaries. The image embedded image is differently colored from the surrounding diamond matrix. The color variation is accomplished by a change in the diamond growth conditions or treatment of the diamond.

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### **US20120047949A1: Multifaceted gemstones with connecting link**

Applicant: -

Publication: 2012-03-01

Filed: 2010-08-31

Status: application

A gemstone and link assembly for forming a piece of jewelry. The gemstone is cut to provide enhanced brilliance and radiance. The gemstone is securely maintained within the link. The link is fabricated of reduced metal thus providing an aesthetically pleasing

assembly.

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**US20120047948A1: Multifaceted gemstones with connecting link**

Applicant: -  
Publication: 2012-03-01  
Filed: 2010-08-31  
Status: application

A gemstone and link assembly for forming a piece of jewelry. The gemstone is cut to provide enhanced brilliance and radiance. The gemstone is securely maintained within the link. The link is fabricated of reduced metal thus providing an aesthetically pleasing assembly.

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**EP2422640A2: Multifaceted gemstones with connecting link**

Applicant: Firestone Inc., United States of America  
Publication: 2012-02-29  
Filed: 2010-12-27  
Status: application

A gemstone having a front and back. The gemstone comprises a lower pavilion and an upper crown. The crown has a top surface and a pair of longitudinally opposed multifaceted sides that slope downwardly away from said top and towards said pavilion. The top surface of the crown comprises two laterally opposed top surface portions that are separated from one another by a single horizontally directed straight linear peak running in a longitudinal direction between said sides with each top surface portion sloping downwardly in a lateral direction away from said peak and towards said front and back respectively. Said pavilion has a bottom surface, said bottom surface having at least one horizontally directed planar bottom portion.

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**CN102342635A:**

Applicant: -  
Publication: 2012-02-08  
Filed: 2010-12-29  
Status: application

Multi-faceted gemstone for use in multi-stone jewelry item e.g. wedding ring, has crown whose top surface is provided with convex shape such that top surface is arcuately runs in lateral direction from front to back of main portion

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**US20120049836A1: Gem Tester**

Applicant: -  
Publication: 2012-03-01



Filed: 2011-06-21  
Status: application

A gem tester for testing a gem under test and a kit including a horizontal recharging stand are disclosed. In one embodiment of the gem tester, an elongated body has a line-of-sight contour tapering from a bulbous end to a radially deviating frontal nose having a probe extending therefrom. Internal circuitry measures electrical and thermal conductivity of the gem under test in order to identify the type of gem under test and drive a color control signal in response thereto. A luminescent mounting extends about the contact to provide, in response to the control signal, a color indication of the identified gem type.

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#### **US20120040868A1: Combinatorial Synthesis of Diamond**

Applicant: -  
Publication: 2012-02-16  
Filed: 2011-08-05  
Status: application

Disclosed is a combinatorial synthesis of Diamond wherein a first reactive species is produced by catalytic treatment of Acetylene, a second reactive species is produced by decomposition of a hydrocarbon source having a low Hydrogen-to-Carbon ratio using a high energy discharge, and the two reactive species so obtained are combined in the vapor phase to yield Diamond without the need of post-treatments. The reaction is efficient and affords Diamond under mild conditions with high purity such that it may be useful for producing Diamond for semiconductor and microelectronics applications.

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#### **US8120758: Fast UV-VIS-NIR absorption spectrometer system and method**

Applicant: Gemological Institute of America, United States of America  
Publication: 2012-02-21  
Filed: 2009-02-27  
Status: granted

A method and system for evaluating a colored gem stone which has been cooled to below a designated temperature are provided. The system includes a cooling unit configured to support and cool a gem stone to below a desired temperature, an electromagnetic radiation source, a spectrometer, an integrating sphere, and a processing unit. The method includes receiving a spectral response of the colored gem stone and sampling a noise component within a range of wavelengths in the spectral response so as to make a baseline determination. The method further includes ascertaining a presence of at least one designated peak within the range of wavelengths as a function of the baseline determination, and evaluating the presence of each of the at least one designated peaks so as to provide an indication of whether the colored gem stone requires further evaluation.

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**US8116552: Apparatus for generating data for determining a property of a gemstone and methods and computer programs for determining a property of a gemstone**

Applicant: Sarin Color Technologies Ltd., Israel  
Publication: 2012-02-14  
Filed: 2007-06-28  
Status: granted

A method of capturing data for gemstone analysis is provided. The method includes capturing images of the gemstone under differing lighting conditions, and comparing the captured images.

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**US8110171: Method for decolorizing diamonds**

Applicant: Bhandari; Rajneesh India  
Publication: 2012-02-07  
Filed: 2006-11-15  
Status: granted

A method for changing the color of a diamond. The method comprises placing the diamond in a substrate holder in a chemical vapor deposition (CVD) equipment. The CVD equipment is maintained at pressures near or below atmospheric pressure. A mixture of gases including hydrogen is introduced inside the CVD equipment. The introduced mixture of gases is energized by using microwave radiation to heat the diamond to temperatures above 1400 C. Then, the diamond is maintained at temperatures above 1400 C. for few seconds to few hours.

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**US8110041: Coloured diamond**

Applicant: -  
Publication: 2012-02-07  
Filed: 2009-04-01  
Status: granted

A method of producing a single crystal CVD diamond of a desired color which includes the steps of providing single crystal CVD diamond which is colored and heat treating the diamond under conditions suitable to produce the desired color. Colors which may be produced are, for example, in the pink-green range.

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**JP2011177883A2: Polishing method for diamond surface**

Applicant: Toyo Seikan Kaisha Ltd  
Publication: 2011-09-15  
Filed: 2010-12-28  
Status: application

Problem to be solved: To provide a polishing method for a diamond surface with less generation of wear powder not only having long life of a polishing member and easy control, and capable of obtaining a surface with high smoothness, but also capable of being also easily applied to polishing of an uneven three-dimensional surface.

Solution: In the polishing method for the diamond surface, the polishing member having a surface made of metal easily reactive with carbon or carburization metal is used, the diamond surface is irradiated with a laser beam prior to polishing of the diamond surface by the polishing member, and subsequent to irradiation of the laser beam, the polishing member is slid/rubbed to a laser beam irradiation part to perform polishing.

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**JP2011178616A2: Method for removing carbon-based substance and method for producing and recycling component or the like including the removing method**

Applicant: Aizawa Tatsuhiko  
Publication: 2011-09-15  
Filed: 2010-03-02  
Status: application

Problem to be solved: To selectively and efficiently remove a substance on the predetermined part of a component or the like having a carbon-based base stock and a carbon-based coating film on the surface thereof to acquire the component or the like having the substance-removed area of predetermined size and shape.

Solution: The method for removing the carbon-based substance comprises a step of simultaneously imparting one or a plurality of atomic oxygen  $O$ , activated oxygen or an oxygen ion at the temperature that is equal to or higher than room temperature and equal to or lower than the softening point of the base stock to be treated, to the optionally-selected surface part of one of graphite, glassy carbon, amorphous carbon (including diamond-like carbon), a carbon nanotube, fullerene, sintered diamond and natural diamond, the carbon-based base stock including the selected one, or the component or a member comprising the carbon-based base stock to remove the carbon-based substance on the optionally-selected surface part to the extent that the optionally-selected surface part has predetermined size and shape.

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**USD654825: Multiple facet gemstone**

Applicant: Rosy Blue Jewelry, United States of America  
Publication: 2012-02-28  
Filed: 2011-05-19  
Status: granted

The ornamental design for a multiple facet gemstone, as shown.

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## **"State of the art" mailing service**

**Patent News nr. 96 (04-2012)**



### **US20120060557A1: Cut product, in particular diamond, with improved characteristics and method for manufacturing such a product**

Applicant: none  
Publication: 2012-03-15  
Filed: 2010-02-19  
Status: application

Cut product manufactured from a (semi) precious stone material, more particularly from natural or synthetic diamond, comprising a lower part (pavilion) with a bottom end (culet); an upper part (crown) having a number of girdle bezel facets and a top end (a point with table width 0 or a top surface (table) with a table width); and a girdle between said lower part and said upper part, wherein said lower part comprises a number of girdle pavilion facets which describe a first angle  $\pm 1$  relative to the plane of the girdle and a number of culet facets which each describe a smaller second angle  $\pm 2$  relative to the plane of the girdle; and wherein the girdle bezel facets are in a twisted position with respect to the girdle pavilion facets in the sense that the bezel facets have perpendicular bisectors which are not coplanar with the perpendicular bisectors of the girdle pavilion facets; and wherein the ratio of the table width and the width of the girdle is 0 to 0.40.

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### **EP2436281A1: Jewellery stone with brilliant cut**

Applicant: D. Swarovski KG, Austria  
Publication: 2012-04-04  
Filed: 2011-09-29  
Status: application

Schmuckstein mit einem Brillantschliff, wobei der Kronenwinkel ( $\alpha$ ) zwischen  $32,8^\circ$  und  $33,0^\circ$  beträgt.

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### **EP2179672B1: A cut diamond**

Applicant: Tolkowsky, Jean-Paul Meijer; Belgium  
Publication: 2012-04-04  
Filed: 2008-10-22  
Status: patent specification

A cut diamond, characterized in that it is a convex polyhedron and has eighty-nine facets, which are thirty-two facets more than a traditional ideal-cut brilliant, in particular eight extra facets on the crown by substituting each of the eight kite facets of a traditional ideal-cut brilliant diamond by two triangular facets, namely a table break facet and a girdle break facet, which have a common edge namely the girdle break which lies in a plane parallel to the table, and whereby twenty-four of the thirty-two extra facets are added in the pavilion by substituting each of the eight lower main facets of a traditional ideal-cut brilliant with four facets, namely a bottom star pavilion, two bottom star halves, and bottom girdle pavilion, touching each other in a point, namely the meeting point, and whereby the pavilion height is approximately three percent longer than the pavilion height in the corresponding traditional ideal-cut brilliant.

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**US20120076717A1: Separation of diamond from gangue minerals**

Applicant: -  
Publication: 2012-03-29  
Filed: 2011-08-27  
Status: application

The present invention relates to a method for separating diamond from gangue minerals. In particular, this method relates to the addition of a first reagent or reagents which contact the diamond in diamond ore slurry to at least partially remove hydrophilic coatings from the diamond surfaces. A second reagent or reagents may also be added to the slurry so that the reagent may adsorb on the diamond surfaces and thereby enhance the hydrophobicity of diamonds. The increase in hydrophobicity may improve the flotation of diamonds.

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**US20120059619A1: Precious stone testing apparatus**

Applicant: -  
Publication: 2012-03-08  
Filed: 2011-02-14  
Status: application

A precious stone testing apparatus includes a hand held casing receiving a microprocessor therein, a testing head, and an indicating arrangement provided at the hand held casing and electrically linked with the microprocessor. The testing head includes a testing probe for contacting a tested object, a UV light source for UV light generation, and a thermal conduction unit electrically linked to the microprocessor for determining a thermal conductivity of the tested object through the testing probe, wherein the thermal conduction unit and the UV light source are independently operated for evaluating the tested object, The indicating arrangement includes a plurality of indicating lights to be activated in responsive to the corresponding thermal conductivity of the tested object so as to classify the tested object.

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**US8134694: Detection of chemical vapor deposition grown diamond**

Applicant: Apollo Diamond Gemstone Corporation, United States of America  
Publication: 2012-03-13  
Filed: 2009-05-08  
Status: granted

Diamonds may be identified as grown by the use of chemical vapor deposition. One or more diamonds may be placed on a surface and exposed to short wavelength light. Diamonds that fluoresce red may be identified as grown by the use of chemical vapor deposition. In some embodiments, the diamonds are cooled prior to exposure to the short wavelength light.

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**EP2431327A1: Method and apparatus for producing large particle diamond**

Applicant: Chu, Xi, Beijing, China  
Publication: 2012-03-21  
Filed: 2010-04-27  
Status: application

The invention provides methods and systems for producing large size diamonds. The methods include using carbon containing gases and supplementary gases to form reaction zones that are suitable for diamonds to grow; controlling the temperatures that are suitable for diamonds to grow; and keeping the small size seeds in motion in the reaction zones to form large size diamonds. The method provides controlling the high temperature endurable small size seeds at suitable temperatures for diamonds to grow and keep them in motion in the reaction zones. The invention also provides systems that allow all the surfaces of the high temperature endurable small size seeds continually extend to form diamonds, then to form large size diamonds. The invention provides a large-scale, low cost production of large size diamonds.

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**EP1365930B1: Method and device for mounting and preparing a gemstone or industrial diamond for the formation of a mark on the surface thereof**

Applicant: De Beers Centenary AG, Switzerland  
Publication: 2012-04-04  
Filed: 2002-02-18  
Status: patent specification

A method of mounting a gemstone or industrial diamond for the formation of a mark on a surface thereof, comprising placing the gemstone or diamond in a container or holder and moulding a holding material as a liquid between the sidewall or sidewalls of the container and the gemstone or diamond in such a way the gemstone or diamond does not touch the sidewall or sidewalls of the container and, looking in a direction normal to the surface to be marked, there is holding material both in front of and behind parts of the gemstone or diamond so that when the holding material is set, the gemstone or diamond is held securely by the holding material, and causing or allowing the holding material to

set, the container defining a locating surface, which locating surface can be directly or indirectly used for locating the gemstone or diamond for a further procedure for the formation of said mark, characterised in that when the gemstone or diamond is placed in the container, said surface is engaged with a contact surface so that at least the surface to be marked remains free of holding material, the locating surface forming part of the container being coincident with or parallel to the surface to be marked, whereby the locating surface can be used for locating the gemstone or diamond with the surface to be marked generally in a predetermined plane.

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**EP2253733B1: High colour diamond**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-03-21  
Filed: 2006-06-22  
Status: granted

A method for producing a CVD diamond having a high colour, which is suitable for optical applications, for example. The method includes adding a gaseous source comprising a second impurity atom type to counter the detrimental effect on colour caused by the presence in the CVD synthesis atmosphere of a first impurity atom type. The described method applies to the production of both single crystal diamond and polycrystalline diamond.

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**US20120066097A1: Uncle Gem V, Universal automatic instant money, data and precious metal & stone transfer machine**

Applicant: -  
Publication: 2012-03-15  
Filed: 2007-08-16  
Status: application

The Universal Automatic Instant Money, Data and Gold Transfer Machine, Uncle GEM V, system is a multiplicity of devices on a communications network available 24 hours a day, used interchangeably as sender, receiver and dispenser of funds and data. The sender accepts standard currency and includes removable medium storage devices to transfer to another such device acting as a receiver/dispenser. Remitted amounts are inserted or deducted from credit/debit accounts or currency and who pays the fees charged is indicated by an initiator of the transaction. Transfer transaction information includes: the type of transfer (money/funds or data); which device deducts the fee; how much money or what data to transfer; and to who and where the transfer transaction is to be made available All Precious metal coins and currency can be Digitally imaged and viewed in real time at any time throughout this process. A receipt is generated by the sender via the system and a receiver becomes a dispenser when the recipient retrieves a pending transaction using the appropriate password or identification. The cash, data, or financial instrument is then dispensed. The Uncle GEMs also feature acceptance of alternate payment options, such as, precious metal coins, i.e., gold, silver platinum rhodium, and

precious stones, i.e. diamonds, sapphires, and rubies. In essence, virtually anything can be bought, purchased, bartered, traded or sold. The Invention is also an Anti-counterfeiting and Anti-terrorism device, machine, process, method and system. It can deter and prevent terrorist attacks upon the US and global monetary systems by using precious metals, i.e., gold, silver, platinum or rhodium, that can be instantaneously authenticated by assay means and cannot be easily printed, duplicated or counterfeited.

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**USD656864: Multiple facet gemstone**

Applicant: Rosy Blue (India) Private Limited, India  
Publication: 2012-04-03  
Filed: 2011-08-03  
Status: granted

The ornamental design for a multiple facet gemstone, as shown.

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## **"State of the art" mailing service**

**Patent News nr. 97 (05-2012)**



### **US20120096898A1: Product with improved optical characteristics**

Applicant: none  
Publication: 2012-04-26  
Filed: 2010-02-16  
Status: application

Cut product manufactured from a rough (semi) precious stone material, more particularly from diamond, comprising a lower part (pavilion) with a bottom end (culet); an upper part (crown) with a number of facets and a top end (a point with table width 0 or a top surface (table) with a table width); and a girdle between lower part and upper part, wherein the lower part comprises a number of girdle pavilion facets which describe a first angle  $a_1$  relative to the plane of the girdle and a number of culet facets which each describe a smaller second angle  $a_2$  relative to the plane of the girdle; wherein the average second angle  $a_2$  lies between 28 and 38 degrees; and wherein the ratio of the table width and the width of the girdle is 0 to 0.40.

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### **US20120079853A1: Gem with brilliant cut**

Applicant: none  
Publication: 2012-04-05  
Filed: 2010-10-01  
Status: application

Brilliant-cut gemstone, wherein the crown angle ( $\pm$ ) is between 32.8° and 33.0°.

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### **US8156760: Gemstone cut**

Applicant: Albert Gad, United States of America  
Publication: 2012-04-17  
Filed: 2009-06-16  
Status: granted

A novel gemstone cut that has 162 facets such that the crown has 65 separate facets and the pavilion has 97 separate facets.

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### **WO2012057651A1: Method for producing gemstones from silicon carbide**

Applicant: Obshestvo S Ogranichennoj Otvetstvennostju «Grannik» Russian Federation  
Publication: 2012-05-03  
Filed: 2011-08-18  
Status: application

The invention relates to cultivating and processing monocrystals. Silicon carbide produced by the given method can be used not only for the electronic industry and for jewellery-making but also as glass or a housing for watches. The method comprises simultaneously cultivating a multiplicity of moissanite crystal blanks in a honeycomb mould of moulding graphite, separating said blanks into individual crystals, and faceting, grinding and polishing said crystals. Before the faceting, grinding and polishing, an operation is carried out to label the blanks for faceting and then to relabel the blanks on the reverse side thereof. Polishing is carried out by polishing the moissanite on a ceramic wheel rotating at a rate of 200 to 300 rpm, with the use of diamond powder (spray) with a grain size of 0.125 to 0.45  $\mu\text{m}$ , ensuring a graduation line depth of less than the length of a light wave in the visible part of the spectrum, wherein the cut and cleaved edges and defective blanks unsuitable for faceting are pulverized and returned to the cultivation stage.

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**AT0552123E: Verfahren und vorrichtung zum befestigen und vorbereiten von edelsteinen zur markierung ihrer oberflächen**

Applicant: Beers Centenary AG, Switzerland  
Publication: 2012-04-15  
Filed: 2002-02-18  
Status: EP patent valid in at

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**AT0551920E: Geschliffener diamant**

Applicant: Tolkowsky Jean-Paul Meijer, Belgium  
Publication: 2012-04-15  
Filed: 2008-10-22  
Status: EP patent valid in at

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**WO2012044251A1: Method for growing white color diamonds by using diborane and nitrogen in combination in a microwave plasma chemical vapor deposition system**

Applicant: The Gemesis Company, Singapore  
Publication: 2012-04-05  
Filed: 2010-10-11  
Status: application

The present application discloses the details of a microwave plasma chemical vapor deposition process that uses Nitrogen and Diborane simultaneously in combination along

with the Methane and Hydrogen gases to grow white color diamonds. The invention embodies using nitrogen to avoid inclusions and impurities in the CVD diamond samples and Diborane for the color enhancement during the growth of diamond. It is also found that heating of the so grown diamonds to 2000 C results in significant color enhancement due to the compensation of Nitrogen and Boron centers in the samples. The origin of the various colors in diamond is explained on the basis of the band diagram of CVD diamond.

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**US20120101830A1: Jewelry system and method for selling a piece of jewelry by including a story of the piece**

Applicant: none  
Publication: 2012-04-26  
Filed: 2010-10-22  
Status: application

A jewelry system and a method for selling jewelry. The jewelry system includes a piece of jewelry that is associated with an information booklet providing a story of formation of the piece and a website for registration of the piece. The initial story that is included in the information booklet includes history of formation of a gemstone used in the piece and the process of manufacture of the setting that lead to the finished product. The website permits the owners to add their personal story to the initial story of the piece. The method for selling the jewelry provides the jewelry, the information booklet and the website address to the buyer. Information regarding the piece is maintained at a server that is linked to the website and may be made available to future second-hand buyers of the piece and to family and friends of the owner.

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**JP2012001394A2: Substrate for growing single crystal diamond, and method for producing the single crystal diamond**

Applicant: Univ Kanazawa  
Publication: 2012-01-05  
Filed: 2010-06-17  
Status: application

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**EP2446072A1: Method for making fancy orange coloured single crystal cvd diamond and product obtained**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-05-02  
Filed: 2010-06-25  
Status: application

Fancy orange synthetic chemical vapor deposition diamond material production by irradiating single crystal chemical vapor deposition diamond material to introduce

isolated vacancies, and annealing diamond material to form vacancy chains

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**EP2446071A1: Method for treating diamond material and product obtained**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-05-02  
Filed: 2010-06-25  
Status: application

Making single crystal synthetic diamond material, comprises treating a nitrogen-containing diamond material by controlled irradiation of the nitrogen-containing diamond material to introduce sufficient defects in the diamond material.

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**EP2446070A1: Method for making fancy pale blue or fancy pale blue /green single crystal cvd diamond and product obtained**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-05-02  
Filed: 2010-06-25  
Status: application

Making fancy pale blue/fancy pale blue/green chemical vapor deposition single crystal diamond material, by irradiating chemical vapor deposition diamond material with electrons, and post-irradiation treating the irradiated diamond material

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**EP2446069A1: Method for treating single crystal cvd diamond and product obtained**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-05-02  
Filed: 2010-06-25  
Status: application

Manufacture of chemical vapor deposited diamond material by providing single crystal diamond material that has been grown by chemical vapor deposition and contains single substitutional nitrogen, irradiating, and annealing

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**AT0550457E: Hochfarbiger diamant**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-04-15  
Filed: 2006-06-22  
Status: EP patent valid in at

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## **"State of the art" mailing service**

**Patent News nr. 98 (06-2012)**



### **US8181482: Cut gemstone exhibiting excellent optical brilliance**

Applicant: Hasenfeld-Stein, New York, NY, United States of America

Publication: 2012-05-22

Filed: 2009-01-22

Status: granted

gemstone including a substantially rectangular girdle, a crown extending in a first direction from the girdle, and a pavilion extending in a second direction from the girdle opposite the first direction. The gemstone has 65 uniquely arranged and angled facets, 25 of which are in the crown, and 40 of which are in the pavilion. The height of the crown is preferably between  $9\frac{1}{2}$  to  $13\frac{1}{2}$ % of the width of the stone, the total depth of the stone is preferably between 63-70.9% of the width of the stone, and the width of the table is preferably between 60-68% of the width of the stone. The crown has four sides, a table, and four bezel facets each positioned at a respective corner of the crown. Each of the four sides of the crown have a first break extending from the girdle toward the table, a second break extending from the first break toward the table, a third break extending from the second break to the table, and a pair of star facets provided between the third break and the bezel facets at each corner of respective side of the crown. Preferably, and relative to a plane parallel to a surface of the table, the first break is cut at an angle of approximately  $35-45^\circ$ , the second break is cut at an angle of approximately  $30-40^\circ$ , the third break is cut at an angle of approximately  $25-35^\circ$ , and the bezel facets are cut at an angle of approximately  $20-30^\circ$ .

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### **EP2211656A4: Gemstones and methods for controlling the appearance thereof**

Applicant: California Inst of Techn, United States of America

Publication: 2012-05-23

Filed: 2008-11-28

Status: application

Gemstone appearance controlling method, involves introducing roughness on multiple facets through application of nanometer and/or micrometer sized features on facets to provide facets with hazy white-colored appearance

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### **US8192713: Method of incorporating a mark in CVD diamond**

Applicant: none

Publication: 2012-06-05  
Filed: 2004-12-10  
Status: granted

A method of incorporating a mark of origin, such as a brand mark, or fingerprint in a CVD single crystal diamond material, includes the steps of providing a diamond substrate, providing a source gas, dissociating the source gas thereby allowing homoepitaxial diamond growth, and introducing in a controlled manner a dopant into the source gas in order to produce the mark of origin or fingerprint in the synthetic diamond material. The dopant is selected such that the mark of origin or fingerprint is not readily detectable or does not affect the perceived quality of the diamond material under normal viewing conditions, but which mark of origin or fingerprint is detectable or rendered detectable under specialised conditions, such as when exposed to light or radiation of a specified wavelength, for example. Detection of the mark of origin or fingerprint may be visual detection or detection using specific optical instrumentation, for example.

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**US8187380: Method of growing single crystal diamond in a plasma reactor**

Applicant: Apollo Diamond, United States of America  
Publication: 2012-05-29  
Filed: 2004-10-29  
Status: granted

Synthetic monocrystalline diamond compositions having one or more monocrystalline diamond layers formed by chemical vapor deposition, the layers including one or more layers having an increased concentration of one or more impurities (such as boron and/or isotopes of carbon), as compared to other layers or comparable layers without such impurities. Such compositions provide an improved combination of properties, including color, strength, velocity of sound, electrical conductivity, and control of defects. A related method for preparing such a composition is also described, as well as a system for use in performing such a method, and articles incorporating such a composition.

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**US8189875: Systems and methods for gemstone identification and analysis**

Applicant: TJS DMCC, Dubai, United Arab Emirates  
Publication: 2012-05-29  
Filed: 2009-03-31  
Status: granted

Images of items of jewelry having gemstones embedded therein are imaged and analyzed to determine the weights associated with the gemstones and, separately the precious metal in which the gemstones are encased without having to remove the gemstones from the jewelry.

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**WO2012058842A1: Apparatus and method for identifying and verifying gemstone**

Applicant: Top Art Jewellery(MFG) LTD China  
Publication: 2012-05-10  
Filed: 2010-12-20  
Status: application

An apparatus and method for identifying and verifying gemstones. The principle is carried out by pre-recording the frequency response spectrum of gemstones, storing the pre-recorded frequency response spectrum, and using the stored frequency response spectrum to identify and verify gemstones thereafter. The apparatus includes an exciter, an acoustic receiver, a digital control module, a storage module, and an identification module. After properly disposing a specimen gemstone, the exciter sends exciting signals to the specimen gemstone, then the specimen gemstone being excited emits unique acoustic signals; the acoustic receiver receives the unique acoustic signals; the acoustic signals are then transferred to the digital control module; the digital control module transforms the received acoustic signals to the frequency response spectrum of the specimen gemstone, and then sends the frequency response spectrum to the storage module for storage; the identification module fetches the stored data from the storage module to identify and verify the gemstone. The identifying and verifying method is convenient, rapid and with low cost; more importantly, it causes no damage to the gemstone itself.

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#### **JP2012033668A2: Laser processing method**

Applicant: Mitsuboshi Diamond Industrial  
Publication: 2012-02-16  
Filed: 2010-07-30  
Status: application

Problem to be solved: To easily part a brittle material substrate such as a sapphire substrate even with a comparatively large thickness without scattering materials, easily handle the substrate, and prevent deterioration of a characteristic of an element formed on the substrate.

Solution: This laser processing method for parting a brittle material substrate by radiating pulse laser light beams includes a first step and a second step. In the first step, the pulse laser lights with a predetermined repetition frequency are radiated so that a condensing point is positioned inside the brittle material substrate so as to form a modified layer inside the brittle material substrate. The pulse laser lights are scanned along a parting schedule line, so that cracks with a length not reaching a first main face are made to travel from the modified layer toward the first main face of the brittle material substrate. In the second step, a second main face of the brittle material substrate is polished while leaving the cracks, so as to remove the modified layer.

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#### **GB1204533A0: Process for manufacturing synthetic single crystal diamond material**

Applicant: Element Six Ltd  
Publication: 2012-04-25

Filed: 2012-03-15  
Status: application

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## **"State of the art" mailing service**

**Patent News nr. 99 (07-2012)**



### **DE11000313U1: Flacher transparenter Gegenstand mit verbesserter Brillanz**

Applicant: Wülfing, Matthias, Germany

Publication: 2012-07-05

Filed: 2011-02-10

Status: utility model

Flacher transparenter Gegenstand, umfassend eine erste Seite und eine dieser gegenüber liegenden zweite Seite, und umfassend mindestens eine, einen Wandbereich aufweisende Vertiefung in der zweiten Seite, bei dem von der ersten Seite in den Gegenstand eindringendes Licht an den Innenflächen der zweiten Seite und der Vertiefung reflektierbar ist, so dass es zumindest teilweise auf der ersten Seite wieder austritt und so dem Gegenstand eine Brillanz verleiht, dadurch gekennzeichnet, dass zur Verbesserung der Brillanz eine Mehrzahl von Facetten in dem Wandbereich der Vertiefung angeordnet ist.

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### **WO2012084750A1: Dislocation engineering in single crystal synthetic diamond material**

Applicant: Element Six Limited, United Kingdom

Publication: 2012-06-28

Filed: 2011-12-16

Status: application

A single crystal CVD synthetic diamond layer comprising a non-parallel dislocation array, wherein the non-parallel dislocation array comprises a plurality of dislocations forming an array of inter-crossing dislocations, as viewed in an X-ray topographic cross-sectional view or under luminescent conditions.

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### **WO2012084661A1: A microwave plasma reactor for manufacturing synthetic diamond material**

Applicant: Element Six Limited, United Kingdom

Publication: 2012-06-28

Filed: 2011-12-14

Status: application

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a plasma chamber; a substrate holder disposed in the plasma chamber for supporting a substrate on which the synthetic diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; wherein the gas flow system comprises a gas inlet nozzle array comprising a plurality of gas inlet nozzles disposed opposite the substrate holder for directing process gases towards the substrate holder, the gas inlet nozzle array comprising: at least six gas inlet nozzles disposed in a substantially parallel or divergent orientation relative to a central axis of the plasma chamber; a gas inlet nozzle number density equal to or greater than 0.1 nozzles/cm<sup>2</sup>, wherein the gas inlet nozzle number density is measured by projecting the nozzles onto a plane whose normal lies parallel to the central axis of the plasma chamber and measuring the gas inlet number density on said plane; and a nozzle area ratio of equal to or greater than 10, wherein the nozzle area ratio is measured by projecting the nozzles onto a plane whose normal lies parallel to the central axis of the plasma chamber, measuring the total area of the gas inlet nozzle area on said plane, dividing by the total number of nozzles to give an area associated with each nozzle, and dividing the area associated with each nozzle by an actual area of each nozzle.

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**WO2012084660A1: A microwave plasma reactor for manufacturing synthetic diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-06-28  
Filed: 2011-12-14  
Status: application

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a microwave generator configured to generate microwaves at a frequency  $f$ ; a plasma chamber comprising a base, a top plate, and a side wall extending from said base to said top plate defining a resonance cavity for supporting a microwave resonance mode, wherein the resonance cavity has a central rotational axis of symmetry extending from the base to the top plate, and wherein the top plate is mounted across said central rotational axis of symmetry; a microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber; a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; and a substrate holder disposed in the plasma chamber and comprising a supporting surface for supporting a substrate on which the synthetic diamond material is to be deposited in use; wherein the resonance cavity is configured to have a height, as measured from the base to the top plate of the plasma chamber, which supports a TM<sub>011</sub> resonant mode between the base and the top plate at said frequency  $f$ , and wherein the resonance cavity is further configured to have a diameter, as measured at a height less than 50% of the height of the resonance cavity as measured from the base, which satisfies the condition that a ratio of the resonance cavity

height / the resonance cavity diameter is in the range 0.3 to 1.0.

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**WO2012084659A2: A microwave plasma reactor for manufacturing synthetic diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-06-28  
Filed: 2011-12-14  
Status: application

A microwave plasma reactor for manufacturing a synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a plasma chamber; a substrate holder disposed in the plasma chamber for supporting a substrate on which the synthetic diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom, wherein the microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber comprises: an annular dielectric window formed in one or several sections; a coaxial waveguide having a central inner conductor and an outer conductor for feeding microwaves to the annular dielectric window; and a waveguide plate comprising a plurality of apertures disposed in an annular configuration with a plurality of arms extending between the apertures, each aperture forming a waveguide for coupling microwaves towards the plasma chamber.

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**WO2012084657A1: A microwave plasma reactor for manufacturing synthetic diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-06-28  
Filed: 2011-12-14  
Status: application

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a plasma chamber; a substrate holder disposed in the plasma chamber and comprising a supporting surface for supporting a substrate on which the synthetic diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; wherein the microwave plasma reactor further comprises an electrically conductive plasma stabilizing annulus disposed around the substrate holder within the plasma chamber.

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**WO2012084658A1: Microwave power delivery system for plasma reactors**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-06-28

Filed: 2011-12-14  
Status: application

A microwave power delivery system for supplying microwave power to a plurality of microwave plasma reactors, the microwave power delivery system comprising: a tuner configured to be coupled to a microwave source and configured to match impedance of the plurality of microwave plasma reactors to that of the microwave source; and a waveguide junction coupled to the tuner and configured to guide microwaves to and from the plurality of microwave plasma reactors, wherein the waveguide junction comprises four waveguide ports including a first port coupled to the tuner, second and third ports configured to be coupled to respective microwave plasma reactors, and a fourth port coupled to a microwave sink, wherein the waveguide junction is configured to evenly split microwave power input from the tuner through the first port between the second and third ports for providing microwave power to respective microwave plasma reactors, wherein the waveguide junction is configured to decouple the second and third ports thereby preventing any reflected microwaves from one of the microwave plasma reactors from feeding across the waveguide junction directly into another microwave plasma reactor causing an imbalance, wherein the waveguide junction is further configured to feed reflected microwaves received back through the second and third ports which are balanced in terms of magnitude and phase to the tuner such that they can be reflected by the tuner and re-used, and wherein the waveguide junction is further configured to feed excess reflected power which is not balanced through the fourth port into the microwave sink.

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#### **WO2012084656A1: Controlling doping of synthetic diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-06-28  
Filed: 2011-12-14  
Status: application

A method of manufacturing synthetic CVD diamond material, the method comprising: providing a microwave plasma reactor comprising: a plasma chamber; one or more substrates disposed in the plasma chamber providing a growth surface area over which the synthetic CVD diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom, injecting process gases into the plasma chamber; feeding microwaves from the microwave generator into the plasma chamber through the microwave coupling configuration to form a plasma above the growth surface area; and growing synthetic CVD diamond material over the growth surface area, wherein the process gases comprise at least one dopant in gaseous form, selected from a one or more of boron, silicon, sulphur, phosphorous, lithium and beryllium at a concentration equal to or greater than 0.01 ppm and/or nitrogen at a concentration equal to or greater than 0.3 ppm, wherein the gas flow system includes a gas inlet comprising one or more gas inlet nozzles disposed opposite the growth surface area and configured to inject process gases

towards the growth surface area, and wherein the process gases are injected towards the growth surface area at a total gas flow rate equal to or greater than 500 standard cm<sup>3</sup> per minute and/or wherein the process gases are injected into the plasma chamber through the or each gas inlet nozzle with a Reynolds number a Reynolds number in a range 1 to 100.

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**WO2012084655A2: Microwave plasma reactors and substrates for synthetic diamond manufacture**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-06-28  
Filed: 2011-12-14  
Status: application

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a microwave generator configured to generate microwaves at a frequency  $f$ ; a plasma chamber comprising a base, a top plate, and a side wall extending from said base to said top plate defining a resonance cavity for supporting a microwave resonance mode between the base and the top plate; a microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber; a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; a substrate holder disposed in the plasma chamber and comprising a supporting surface for supporting a substrate; and a substrate disposed on the supporting surface, the substrate having a growth surface on which the synthetic diamond material is to be deposited in use, wherein the substrate dimensions and location within the resonance cavity are selected to generate a localized axisymmetric  $E_z$  electric field profile across the growth surface in use, the localized axisymmetric  $E_z$  electric field profile comprising a substantially flat central portion bound by a ring of higher electric field, the substantially flat central portion extending over at least 60% of an area of the growth surface of the substrate and having an  $E_z$  electric field variation of no more than  $\pm 10\%$  of a central  $E_z$  electric field strength, the ring of higher electric field being disposed around the central portion and having a peak  $E_z$  electric field strength in a range 10% to 50% higher than the central  $E_z$  electric field strength.

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**WO2012083037A1: Authentication, security, and/or marketing display kit for a precious gem and method**

Applicant: S.A. Gems Distributors, United States of America  
Publication: 2012-06-21  
Filed: 2011-12-15  
Status: application

A new system of packaging and offering precious gems for sale are disclosed. A precious gem and an abbreviated certificate of authenticity about that gem are sealed within an at least partly see-through security case. The sealed security case is secured inside of an enclosed compartment in a security carton, and the gem and the abbreviated certificate of

authenticity are visible through one or more windows in the security carton. Additional information about the gem is stored in a storage compartment in the security carton, which is separately accessible from the enclosed compartment. A retailer displays and offers the gem for sale directly to end consumers in the display package, and the consumer is assured by the display package that the gem has the characteristics disclosed on the abbreviated certificate of authenticity without requiring an intermediate local jeweler to verify the characteristics.

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**US8213000: Retail compatible detection of CVD grown diamond**

Applicant: Apollo Diamond Gemstone Corporation, United States of America  
Publication: 2012-07-03  
Filed: 2009-05-08  
Status: granted

A system includes a radiation source to provide short wavelength light. A holder positions a table of a gemstone to receive the light. A detector is positioned to receive fluorescent light from the gemstone when the gemstone is a CVD grown gemstone.

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**EP2468392A2: Diamond tool, synthetic single crystal diamond and method for synthesizing single crystal diamond, and diamond jewelry**

Applicant: Sumitomo Electric Industries, Sumitomo Electric Hardmetal, Japan  
Publication: 2012-06-27  
Filed: 2004-10-08  
Status: application

A synthetic single crystal diamond synthesized under ultra high pressure at high temperature in a temperature difference method, characterized by having a crystal containing nickel as a substitutional atom.

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## **"State of the art" mailing service**

**Patent News nr. 100 (08/09-2012)**



### **US20120180525A1: Round gemstone cut shape providing a specific optical pattern**

Applicant: none  
Publication: 2012-07-19  
Filed: 2011-01-14  
Status: application

A gemstone cut with a table facet, where the gemstone receives existing light from around the viewer and the facets on the bottom of the diamond effectively reflect the existing light back into the eyes of the beholder in such a manner as to maximize light performance, and to produce a unique and distinct look of light in the form of a flower with eight rounded pedals under the table facet which can be observed in natural ambient light.

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### **US8215127: Diamond having two-stage pavilion**

Applicant: Hohoemi Brains, Japan  
Publication: 2012-07-10  
Filed: 2008-01-09  
Status: granted

An ornamental diamond is provided as an extremely bright diamond with numerous reflection patterns when viewed from above its table facet and crown facets. The diamond has the same crown as the round brilliant cut and its pavilion consists of a first pavilion and a second pavilion separated by a horizontal division plane. The second pavilion is an octagonal pyramid and its side faces form second pavilion main facets. The first pavilion is a hexadecagonal frustum with a top face on the horizontal division plane and its side faces form first lower girdle facets. First pavilion main facets extend from the girdle and between the first lower girdle facets, into between the second pavilion main facets. The ornamental diamond having the two-stage pavilion is much more brilliant than and has twice as many reflection patterns as the conventional round brilliant cut.

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### **DE202011000313U1: Flacher transparenter Gegenstand mit verbesserter Brillanz**

Applicant: Wuelfing Matthias, Germany  
Publication: 2012-07-05  
Filed: 2011-02-10  
Status: utility model

Flacher transparenter Gegenstand, umfassend eine erste Seite und eine dieser gegenüber liegenden zweite Seite, und umfassend mindestens eine, einen Wandbereich aufweisende Vertiefung in der zweiten Seite, bei dem von der ersten Seite in den Gegenstand eindringendes Licht an den Innenflächen der zweiten Seite und der Vertiefung reflektierbar ist, so dass es zumindest teilweise auf der ersten Seite wieder austritt und so dem Gegenstand eine Brillanz verleiht, dadurch gekennzeichnet, dass zur Verbesserung der Brillanz eine Mehrzahl von Facetten in dem Wandbereich der Vertiefung angeordnet ist.

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**DE11000649A1: Flacher transparenter Gegenstand mit verbesserter Brillanz**

Applicant: Wuelfing Matthias, Germany  
Publication: 2012-08-16  
Filed: 2011-02-10  
Status: application

Die Erfindung betrifft das Gebiet transparenter, eine Brillanz aufweisender Gegenstände. Insbesondere betrifft die Erfindung derartige Gegenstände, welche eine hohe Brillanz trotz flacher Geometrie aufweisen.

Der erfindungsgemäße Gegenstand umfasst eine erste Seite und eine dieser gegenüber liegenden zweite Seite, und mindestens eine, einen Wandbereich aufweisende Vertiefung in der zweiten Seite. Von der ersten Seite in den Gegenstand eindringendes Licht ist an den Innenflächen der zweiten Seite und der Vertiefung reflektierbar, so dass es zumindest teilweise auf der ersten Seite wieder austritt und so dem Gegenstand eine Brillanz verleiht, wobei zur Verbesserung der Brillanz eine Mehrzahl von Facetten in dem Wandbereich der Vertiefung angeordnet ist, und eine facettierte Spitze in der Vertiefung angeordnet sein kann.

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**WO2012106324A1: Multilayer structure for a diamond growth and a method of providing the same**

Applicant: The Gemesis Diamond Company  
Publication: 2012-08-09  
Filed: 2012-01-31  
Status: application

A multi-layer structure in a reaction cell for a diamond growth is provided. The multi-layer structure includes: a diamond seed; a first metal catalyst layer provided on the diamond seed, the first metal catalyst layer containing a first concentration of carbon; a second metal catalyst layer provided on the first metal layer, the second metal catalyst layer containing a second concentration of carbon that is higher than the first concentration; and a carbon source layer provided on the second metal layer.

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**WO2012093408A1: Apparatus and method for assessing optical performance quality of a gemstone**

Applicant: Mistry Janak Arvindbhai, India  
Publication: 2012-07-12  
Filed: 2012-01-04  
Status: application

The present invention provides an apparatus and method for assessing optical performance quality of a gemstone. The apparatus comprises a means for holding at least one gemstone, a dome adapted over the means for holding surrounding/covering the gemstone; at least one light source adapted inside the dome to throw light at the centre of the dome. The method for assessing optical performance quality of a gemstone, comprises steps of providing a gemstone to be assessed for optical performance quality, holding the gemstone under a dome; focussing light over the gemstone, and assessing optical performance quality of the gemstone through unaided eyes by viewing Effective Total Angular Size (ETAS) pattern of the gemstone reflected over the dome.

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**US20120199792A1: Novel Cherkasky's synthetic diamonds and diamond-like materials and methods and devices for production thereof**

Applicant: Cherkasky Alexander; Germany  
Publication: 2012-08-09  
Filed: 2012-02-01  
Status: application

The object of the invention is to increase the yield of the HPHT (High-Pressure High-Temperature) Technology for production of synthetic diamonds and diamond-like materials as well as to achieve the continuous production of large amounts or quantities of synthetic diamonds with perfect or high quality. The object of the invention will be reached by methods and devices according to the present invention, wherein the method comprises the following steps: cultivation or collection of biomass, preparing and chemical modification of biomass preferably by (adding or enriching with) salt or salts containing at least one catalyst, incineration of biomass to ash, adding to ash modifiers including salt or salts containing at least one catalyst, HPHT-treatment of the resulting carbon-containing matrix and the isolation of the products after the HPHT-treatment.

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**US20120195819A1: Method and system to produce large particle diamond**

Applicant: none  
Publication: 2012-08-02  
Filed: 2010-04-27  
Status: application

The invention provides methods and systems for producing large size diamonds. The methods include using carbon containing gases and supplementary gases to form reaction zones that are suitable for diamonds to grow; controlling the temperatures that are

suitable for diamonds to grow; and keeping the small size seeds in motion in the reaction zones to form large size diamonds. The method provides controlling the high temperature endurable small size seeds at suitable temperatures for diamonds to grow and keep them in motion in the reaction zones. The invention also provides systems that allow all the surfaces of the high temperature endurable small size seeds continually extend to form diamonds, then to form large size diamonds. The invention provides a large-scale, low cost production of large size diamonds.

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**US20120179290A1: Diamond sorting system**

Applicant: none  
Publication: 2012-07-12  
Filed: 2010-09-22  
Status: application

A diamond sorting system comprising a diamond source for supplying one or more diamonds to be graded by a vision system having one or more cameras arranged to take one or more images of the diamond, and a processor arranged to receive the image data and execute an algorithm on the data to grade the diamond. The sorting system further comprising a diamond collection unit arranged to receive a graded diamond from the vision system and an electromechanical diamond transporter arranged to transport a diamond to be graded from the diamond source to the vision system, and further arranged to transport a graded diamond from the vision system to the diamond collection unit.

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**US20120170019A1: Detection of chemical vapor deposition grown diamond**

Applicant: Apollo Diamond Gemstone Corporation, United States of America  
Publication: 2012-07-05  
Filed: 2012-03-12  
Status: application

Diamonds may be identified as grown by the use of chemical vapor deposition. One or more diamonds may be placed on a surface and exposed to short wavelength light. Diamonds that fluoresce red may be identified as grown by the use of chemical vapor deposition. In some embodiments, the diamonds are cooled prior to exposure to the short wavelength light.

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**US20120167362A1: Gemstone alignment**

Applicant: De Beers Centenary, Switzerland  
Publication: 2012-07-05  
Filed: 2010-07-07  
Status: application

An apparatus and method for aligning a gemstone such as diamond with a predetermined vertical axis is described. The apparatus includes an upwardly extending nozzle aligned

with the vertical axis and sized to allow the gemstone to settle into it under the action of gravity so that the article is supported by the aperture. A fluid supply system supplies fluid to the nozzle under sufficient pressure to support the article within or above the aperture. A fluid pressure control system controls the pressure of fluid supplied to the nozzle, so that it can be reduced gradually.

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**US8252263: Device and method for growing diamond in a liquid phase**

Applicant: none  
Publication: 2012-08-28  
Filed: 2009-04-14  
Status: granted

A method of growing a diamond mass in a liquid growth medium. The liquid growth medium can include a carbon source, a diamond growth catalyst such as a diamond catalyst metal-rare earth element alloy or nanocatalyst, and a dissociated hydrogen of a hydrogen source. The carbon source provides carbon atoms for growing diamond and can include a diamond seed material for diamond growth. The molten liquid phase provides a diamond growth catalyst which allows the carbon to form diamond at the temperature and low pressure conditions discussed. Furthermore, the dissociated hydrogen acts as a concentrator for assembling carbon atoms at a relatively high concentration which mimicks, in some respects, diamond growth under more conventional high pressure processes without the high pressure.

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**US8244624: Establishing standardized diamond profiles and pricing**

Applicant: Gorenstein Ran, Belgium  
Publication: 2012-08-14  
Filed: 2008-07-15  
Status: granted

A method and system for establishing an index useful for pricing diamonds in a standardized way that thus makes diamonds amenable for derivative trading via futures contracts or the like.

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**US8239211: Global investment grade for natural and synthetic gems used in financial investments and commercial trading and method of creating standardized baskets of gems to be used in financial and commercial products**

Applicant: Gemshares LLC, United States of America  
Publication: 2012-08-07  
Filed: 2009-03-27  
Status: granted

A process to create a fungible global standard for diamonds and gemstones. The process involves grouping diamonds in an investment standard according to their gemological,

proportional, optical and light behavior characteristics. Diamonds that conform to the investment grade standard are interchangeable within a specific size range according to an equivalent monetary bundling process. Diamonds subjected to the standard conform to a holistic set of gemological, proportional, optical and light characteristic requirements that enables diamonds to be classified into an extraordinarily homogeneous, visually indistinguishable and highly fungible group which can be used to create baskets of diamonds to form an index/benchmark for diamond pricing, financial instruments, and a standard that can be used for certifying diamonds as investment grade to insure quality.

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**US8239143: System and method for gemstone cut grading**

Applicant: Gemological Institute of America, United States of America  
Publication: 2012-08-07  
Filed: 2009-07-13  
Status: granted

A system for grading the cut of a diamond utilizes a number of appearance metrics to generate scores for a number of cut components that affect cut quality. These cut components include brightness, fire, scintillation, overweight, durability, polish, and symmetry. The cut grading system employs a cut grading algorithm that processes the individual scores obtained for the cut components to generate an overall cut grade for the diamond. The scoring methodology and the cut grading algorithm are designed to emulate actual observation grading such that the overall cut grade represents a fair indication of the cut quality of the diamond. In one practical embodiment, the cut grading system is fully automated and computer-implemented.

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**US20120192791A1: CVD apparatus with electrode**

Applicant: none  
Publication: 2012-08-02  
Filed: 2010-10-08  
Status: application

A manufacturing apparatus for deposition of a material on a carrier body and an electrode for use with the manufacturing apparatus are provided. The manufacturing apparatus includes a housing that defines a chamber. The housing also defines an inlet for introducing a gas into the chamber and an outlet for exhausting the gas from the chamber. At least one electrode is disposed through the housing with the electrode at least partially disposed within the chamber. The electrode has an exterior surface. A first exterior coating having an electrical conductivity of at least  $7 \times 10^6$  Siemens/meter at room temperature is disposed on the exterior surface of the electrode. A second exterior coating different from the first exterior coating is disposed on the first exterior coating. A power supply device is coupled to the electrode. t

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**US20120199069A1: CVD apparatus**

Applicant: none  
Publication: 2012-08-09  
Filed: 2010-10-08  
Status: application

A manufacturing apparatus for deposition of a material on a carrier body and an electrode for use with the manufacturing apparatus are provided. The manufacturing apparatus includes a housing that defines a chamber. The housing also defines an inlet for introducing a gas into the chamber and an outlet for exhausting the gas from the chamber. At least one electrode is disposed through the housing with the electrode at least partially disposed within the chamber. The electrode includes a shaft having a first end and a second end, and a head disposed on one of the ends of the shaft. The head of the electrode has an exterior surface having a contact. An exterior coating is disposed on the exterior surface of the electrode, outside of the contact region. The exterior coating has a greater wear resistance than nickel as measured in  $\text{mm}^3/\text{N}\cdot\text{m}$ .

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**JP2012041258A2: Base material for growing single crystal diamond, and method for manufacturing single crystal diamond substrate**

Applicant: Shin-Etsu Chemical  
Publication: 2012-03-01  
Filed: 2010-11-26  
Status: application

Problem to be solved: To provide a base material for growing a single crystal diamond and a method for manufacturing a single crystal diamond substrate attaining the growth of a single crystal diamond with a large area and good crystallinity and the low-cost manufacture of the single crystal diamond substrate of high quality.

Solution: The base material for growing the single crystal diamond includes at least a base material made of material with a linear expansion coefficient smaller than that of MgO and not smaller than  $0.5 \times 10^{-6}/\text{K}$ ; a single crystal MgO layer formed on the side, where the single crystal diamond is grown, of the base material by a laminating method; and a film made of any one of an iridium film, a rhodium film and a platinum film heteroepitaxially grown on the single crystal MgO layer.

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**JP2012001394A2: Substrate for growing single crystal diamond, and method for producing the single crystal diamond**

Applicant: Univ Kanazawa  
Publication: 2012-01-05  
Filed: 2010-06-17  
Status: application

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**JP2012075900A2: Gem with brilliant cut**

Applicant: D Swarovski

Publication: 2012-04-19  
Filed: 2011-09-30  
Status: application

Problem to be solved: To further improve the esthetic value of a gemstone with brilliant cut.

Solution: In the brilliant-cut gemstone, the crown angle ( $\alpha$ ) is between  $32.8^\circ$  and  $33.0^\circ$ .

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**WO2012084659A3: A microwave plasma reactor for manufacturing synthetic diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-08-23  
Filed: 2011-12-14  
Status: application

A microwave plasma reactor for manufacturing a synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a plasma chamber; a substrate holder disposed in the plasma chamber for supporting a substrate on which the synthetic diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom, wherein the microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber comprises: an annular dielectric window formed in one or several sections; a coaxial waveguide having a central inner conductor and an outer conductor for feeding microwaves to the annular dielectric window; and a waveguide plate comprising a plurality of apertures disposed in an annular configuration with a plurality of arms extending between the apertures, each aperture forming a waveguide for coupling microwaves towards the plasma chamber.

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**WO2012084655A3: Microwave plasma reactors and substrates for synthetic diamond manufacture**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-08-16  
Filed: 2011-12-14  
Status: application

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a microwave generator configured to generate microwaves at a frequency  $f$ ; a plasma chamber comprising a base, a top plate, and a side wall extending from said base to said top plate defining a resonance cavity for supporting a microwave resonance mode between the base and the top plate; a microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber; a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; a substrate holder disposed

in the plasma chamber and comprising a supporting surface for supporting a substrate; and a substrate disposed on the supporting surface, the substrate having a growth surface on which the synthetic diamond material is to be deposited in use, wherein the substrate dimensions and location within the resonance cavity are selected to generate a localized axisymmetric  $E_z$  electric field profile across the growth surface in use, the localized axisymmetric  $E_z$  electric field profile comprising a substantially flat central portion bound by a ring of higher electric field, the substantially flat central portion extending over at least 60% of an area of the growth surface of the substrate and having an  $E_z$  electric field variation of no more than  $\pm 10\%$  of a central  $E_z$  electric field strength, the ring of higher electric field being disposed around the central portion and having a peak  $E_z$  electric field strength in a range 10% to 50% higher than the central  $E_z$  electric field strength.

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## **"State of the art" mailing service**

**Patent News nr. 101 (10-2012)**



### **US20120227444A1: Gemstone with a chaton cut**

Applicant: none  
Publication: 2012-09-13  
Filed: 2012-03-05  
Status: application

Gemstone with a chaton cut, in which tapering facets of a crown adjoin a flat table all the way round inclined relative to the table, the said facets extending as far as a rondist at which the gemstone has the largest transverse dimension, wherein a pavilion of facets preferably terminating at a point adjoins below the rondist, and wherein the gemstone is at least partially made of glass, and wherein the crown angle ( $\pm$ ) is between  $40.5^\circ$  and  $42.5^\circ$ .

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### **EP2505096A1: Jewellery stone with chaton cut**

Applicant: D. Swarovski, Austria  
Publication: 2012-10-03  
Filed: 2012-02-23  
Status: application

Schmuckstein mit einem Chatonschliff, bei dem sich an eine ebene Tafel eine Krone rundherum schräg gegenüber der Tafel abfallende Facetten der Krone anschließen, die bis zu einer Rondiste reichen, an der der Schmuckstein die größte Querabmessung aufweist, wobei unterhalb der Rondiste ein Pavillon aus vorzugsweise spitz zusammenlaufender Facetten anschließt, wobei der Schmuckstein zumindest zum Großteil, vorzugsweise zur Gänze, aus Glas besteht und wobei der Kronenwinkel zwischen  $40,5^\circ$  und  $42,5^\circ$  beträgt.

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### **AT0511056B1: Lasermarkierter Gegenstand**

Applicant: Swarovski, Austria  
Publication: 2012-09-15  
Filed: 2011-03-07  
Status: granted

Gegenstand, der zumindest in einem Bereich aus einem transparenten oder transluzenten Material, insbesondere aus Glas, besteht, wobei der Gegenstand in dem transparenten oder transluzenten Bereich ein dynamisches Moiré-Muster aufweist, und wobei das



Moiré-Muster durch Überlagerung von wenigstens zwei, vorzugsweise von genau zwei, gelaserten und zumindest bereichsweise visuell voneinander getrennten Rasterstrukturen zustande kommt, wobei sich die Rasterstrukturen in verschiedenen Schichten im Inneren des transparenten oder transluzenten Bereichs oder in wenigstens einer Schicht im Inneren und in einer Beschichtung wenigstens einer Oberfläche des transparenten oder transluzenten Bereichs oder in wenigstens einer ersten Schicht im Inneren des transparenten oder transluzenten Bereichs und wenigstens einer zweiten virtuellen Schicht, die sich durch Spiegelung der ersten Schicht an einer Spiegelfläche ergibt, befinden.

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**AT0012644U1: Brillantschliff**

Applicant: Swarovski, Austria  
Publication: 2012-09-15  
Filed: 2011-03-07  
Status: utility model with search report

Schmuckstein mit einem Chatonschliff, bei dem sich an eine ebene Tafel eine Krone rundherum schräg gegenüber der Tafel abfallende Facetten der Krone anschließen, die bis zu einer Rondiste reichen, an der der Schmuckstein die größte Querabmessung aufweist, wobei unterhalb der Rondiste ein Pavillon aus vorzugsweise spitz zusammenlaufender Facetten anschließt, wobei der Schmuckstein zumindest zum Großteil, vorzugsweise zur Gänze, aus Glas besteht und wobei der Kronenwinkel zwischen 40,5° und 42,5° beträgt.

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**US20120242977A1: Retail compatible detection of cvd grown diamond**

Applicant: Apollo Diamond Gemstone Corporation, United States of America  
Publication: 2012-09-27  
Filed: 2012-06-07  
Status: application

A system includes a radiation source to provide short wavelength light. A holder positions a table of a gemstone to receive the light. A detector is positioned to receive fluorescent light from the gemstone when the gemstone is a CVD grown gemstone.

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**US8278906: Apparatus for simulating thermal conductivity and electrical resistance of diamonds and their substitutes**

Applicant: Tri Electronics, United States of America  
Publication: 2012-10-02  
Filed: 2010-07-16  
Status: granted

The invention relates to substitutes of real gems for the purpose of calibrating of commercial diamond testers and for verification of their correct operation. Suggested apparatus consists of a set of objects, which are made of cheap materials like brass,

stainless steel, and electrically conductive rubber, and which exhibit combination of thermal and electric conductivities typical for diamonds and their popular imitations like moissanites, cubic zirconia, and others.

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**US8271521: Computerized search technique, such as an internet-based gemstone search technique**

Applicant: Blue Nile, United States of America  
Publication: 2012-09-18  
Filed: 2006-08-24  
Status: granted

Methods and systems for searching through databases of items are described. In some cases, the system presents a display of searched items. The system may present a customizable interface of displayed search results, where a range of values displayed may be customizable. Further, the displayed attributes of searched items may be customizable. Other search and display functions are also disclosed.

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**US8270719: Gem pattern matching algorithm to determine the percentage match of a target gem pattern to a database of gem patterns**

Applicant: Gemological Appraisal Association, United States of America  
Publication: 2012-09-18  
Filed: 2008-10-14  
Status: granted

A method and gem pattern matching technique to analyze a target gemstone by analyzing a pattern created by transmitting a light source such as a laser beam through the gemstone to create a visual optical pattern and comparing the pattern to a database of known gemstone patterns to determine the percentage likelihood that the target gemstone will match a gemstone in the database. The matching is based on the weight of the heaviest spot in the pattern and its location in the gemstone image and comparing it to the weight and location of the heaviest spots in each gemstone image in the database to determine a percentage matching.

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**JP2012092018A2: Diamond single crystal substrate**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2012-05-17  
Filed: 2012-02-16  
Status: application

Problem to be solved: To provide a diamond single crystal substrate having a large area and high quality to be used for a semiconductor material or the like.

Solution: The diamond single crystal substrate is obtained by arranging side by side a plurality of diamond single crystal seed substrates in which the plane orientation of a

main surface is aligned substantially in  $\langle 100 \rangle$  direction, growing diamond single crystals on the seed substrates by a chemical vapor deposition method, and integrating all the surfaces. The plane orientations of the main surfaces of the plurality of diamond single crystal seed substrates have an inclination of  $5^\circ$  or less relative to  $\{100\}$  plane, and the diamond single crystal layers grown from the seed substrates are grown, in the first stage, by use of a reaction gas containing at least hydrogen and carbon in a condition in which a value  $\alpha$  obtained by multiplying a ratio of growing rate in  $\langle 100 \rangle$  direction to growing rate in  $\langle 111 \rangle$  direction by  $\sqrt{3}$  is 2.0 or more and less than 3.0, and grown in the second stage, by use of a reaction gas containing at least hydrogen and carbon and further one or more of nitrogen, phosphorus, fluorine and chlorine in a condition where  $\alpha$  is 3.0 or more.

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**JP2012086226A2: Laser beam machining device, method for machining workpiece, and method for dividing workpiece**

Applicant: Mitsuboshi Diamond Industrial  
Publication: 2012-05-10  
Filed: 2010-10-15  
Status: application

Problem to be solved: To provide a method for machining a divided body, surely dividing work piece.

Solution: A light path extending from a light source, which emits a pulsed-laser-beam of a pulse width of psec order, to a stage is partially split into first and second light paths. For each unit pulsed beam, a length of second light path is set so that a second half pulsed beam travelling along the latter is delayed with respect to a first half pulsed beam travelling along the former. The irradiation region of the first half pulsed beam accords with that of the second half pulsed beam, and a worked surface is irradiated with the pulsed laser beam to discretely form the irradiation regions for respective unit pulsed beams, so that cleavage or parting of the work piece is generated between the irradiation regions to form starting points for dividing to the work piece.

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**JP2012051036A2: Laser beam machining apparatus**

Applicant: Mitsuboshi Diamond Industrial  
Publication: 2012-03-15  
Filed: 2011-12-15  
Status: application

Problem to be solved: To provide a machining method for forming a dividing starting point in a work piece by which optical absorption in a machining trace is reduced, efficiency of taking out light from sapphire is enhanced and high-speed processing can be performed, and to provide a laser beam machining apparatus that materializes this method.

Solution: The work piece is irradiated with a pulsed laser beam in such a manner that an irradiation region for each unit pulsed beam of an ultra-short pulsed laser beam is formed discretely on the work piece. By an impact or a stress caused when an irradiation position

is irradiated with each unit pulsed beam, cleavage or parting of the work piece is successively generated between the irradiation regions, thereby forming on the work piece a starting point for dividing.

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**JP2012045830A2: Laser cutting apparatus**

Applicant: Mitsuboshi Diamond Industrial  
Publication: 2012-03-08  
Filed: 2010-08-27  
Status: application

Problem to be solved: To provide a laser cutting apparatus capable of curving and fixing a substrate without changing a fixing base even when the substrate is thick.

Solution: The laser cutting apparatus includes: the fixing base for fixing the substrate; a bar-like member curving the substrate fixed to the fixing base so that the surface side irradiated with laser beams is convex; and pressing members pressing down and fixing both sides of the substrate onto the fixing base with the bar-like member at the center between the pressing members. The substrate is placed on the fixing base, and the substrate is pressed down and fixed by the pressing members. The substrate is then curved by the bar-like member, and irradiation of laser beams and spraying of a cooling medium are carried out to form a vertical crack in the substrate to cut the substrate.

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**“State of the art”  
mailing service**

**Patent News nr. 102 (11-2012)**



**EP2507405A1: Method for forming a decorative coating on a gemstone, a decorative coating on a gemstone, and uses of the same**

Applicant: Beneq OY, Finland  
Publication: 2012-10-10  
Filed: 2010-11-19  
Status: application

Method for forming decorative coating on gemstone, involves introducing second precursor to reaction space such that portion of second precursor reacts with portion of first precursor to form conformal absorbing film on substrate

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**US8297075: Gemstone cut**

Applicant: -  
Publication: 2012-10-30  
Filed: 2007-08-08  
Status: granted

A gemstone cut into a round stone and method of cutting a gemstone are disclosed herein. A crown having a table may be surrounded by eight star sets. The eight star sets may be surrounded by eight bezel facets. The eight bezel facets may be surrounded by eight pairs of upper girdle facet sets. Each upper girdle facet set may have one primary upper girdle facet and two secondary upper girdle facets. Each star set may have one primary star facet and four secondary star facets. A bottom having a culet may be surrounded by 8 pavilions the eight pavilions may be surrounded by 8 lower girdle facet sets. Each lower girdle facet set may have one primary lower girdle facet and two secondary lower girdle facets. Both the crown and bottom may be surrounded by 16 girdle facets or by perfectly circular girdle.

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**CA2772485A1: Natural fluorescent diamond ornament that emits multi-color light and hidden text/pattern**

Applicant: Liu Shu-Fen Taiwan  
Publication: 2012-09-24  
Filed: 2012-03-23  
Status: application

A natural fluorescent diamond ornament that emits multi-color light and hidden text/pattern includes an ornament base, multiple natural fluorescent diamonds inlaid on the ornament base and multiple natural non-fluorescent diamonds inlaid on the ornament base. Each of the natural fluorescent diamonds and the natural non-fluorescent diamonds is polygonal, refractive, and light-pervious. When exposed under UV light, the multiple natural fluorescent diamonds inlaid on the ornament base of the ornament will emit purplish-blue light which is distinct from the light emitted by the natural non-fluorescent diamonds inlaid on the ornament base. When the multiple natural fluorescent diamonds are arranged in a predetermined pattern and exposed to UV light, the natural fluorescent diamonds arranged in the predetermined pattern will emit purplish-blue light to exhibit a creative configuration that is amazingly mysterious and novel.

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**US20120274751A1: Inclusion detection in polished gemstones**

Applicant: De Beers Centenary AG, Switzerland  
Publication: 2012-11-01  
Filed: 2010-11-02  
Status: application

A method and apparatus for generating a 3D model of and/or detecting inclusions in a polished gemstone such as diamond is described. The gemstone is rotated in a series of discrete increments. At each rotational position of the gemstone, the gemstone is illuminated with collimated light and a silhouette image recorded. At each rotational position, the gemstone is also (before further rotation) illuminated with diffuse light, and a diffuse image recorded. The images are analyzed to obtain a 3D model of the surface of the gemstone. Features may then be identified in the diffuse images and tracked between subsequent diffuse images. The tracked features may be located relative to the 3D model of the gemstone, taking into account reflection and refraction of light rays by the gemstone. Some or all of the located features may then be identified as inclusions.

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**US8289621: Reflected dark field method and apparatus**

Applicant: Gemological Institute of America, United States of America  
Publication: 2012-10-16  
Filed: 2008-10-07  
Status: granted

A reflected dark field structure includes a bottom plate, a support tube, a light unit, a diffuser structure, and a reflector unit that provides reflected dark field illumination, such that a gem held by the support tube and surrounded by the diffuser structure is illuminated and viewable through an aperture in the reflector unit. A method for imaging and analyzing a gem includes placing the gem onto a support tube where it is illuminated with dark field and reflected dark field illumination, and viewing the gem via an aperture located on a top reflector unit, which provides a top cover for the gem. Furthermore, a method and apparatus for obtaining images of a gem includes a dark field stage, a reflector unit, and an image-acquiring device, such that a gem placed in the dark field

stage is illuminated, and such that the reflector unit covers the dark field stage and provides reflected dark field illumination, and such that the image-acquiring device is directed towards an aperture in the reflector unit.

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**JP2012111653A2: Production process for large area cvd diamond single crystal and large area CVD diamond single crystal obtained by the process**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2012-06-14  
Filed: 2010-11-24  
Status: application

Problem to be solved: To provide a high quality CVD diamond single crystal having a large area and no depressions, and a production process for obtaining the same.

Solution: The process comprises arranging not less than 4 diamond single crystal substrates having the principal plane of {100} with their {100} sides adjacent to each other, growing diamond on the principal planes of the arranged single crystal substrates by means of gas phase synthesis and removing the single crystal substrates to obtain a piece of a large area CVD diamond single crystal. Given unit A consists of two optionally selected adjacent single crystal substrates: A1 and A2, and unit B consists of the two other adjacent single crystal substrates: B1 and B2 in the four adjacent single crystal substrates. The diamond single crystal substrates are arranged in a way that the surfaces of the opposite sides of A and B are each on the same plane and the surface central to the distance between the sides where A1 and A2 are faced and the surface central to the distance between the sides where B1 and B2 are faced are shifted in the direction of the surface where the unit A faces the unit B.

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**JP2012111654A2: Single crystal diamond substrate and method for producing the same**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2012-06-14  
Filed: 2010-11-24  
Status: application

Problem to be solved: To provide a mosaic single crystal in which information of lattice constant, strain or the like are also made common and which is excellent in crystallinity.

Solution: A single crystal diamond is synthesized on a seed substrate by a vapor phase synthetic method, then a growth layer is separated from the seed substrate in the vicinity of the growth interface, and the growth layer and the seed substrate are put side by side in such a manner that respective separated surfaces become upper surfaces. Thereafter, one joined diamond substrate is produced by epitaxially growing diamond on the two substrates. Further, the single crystal substrate is enlarged by using the obtained joined diamond substrate as a seed crystal, and repeating the same operation two or three times. Thereby, a single crystal diamond substrate, in which units A (derived from the surface of the seed crystal) having a crystallographic character of the seed crystal substrate and units

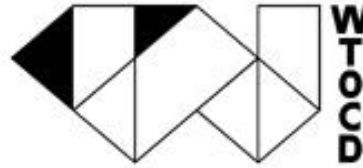
B (derived from the separation surface of the growth layer) having mirror image relation with the crystallographic character of the seed crystal substrate are put side by side in a mosaic pattern, is obtained.

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## **“State of the art” mailing service**

**Patent News nr. 103 (12-2012)**



### **EP2524616A1: Gemstone of natural diamond and method applied thereto**

Applicant: Diamond Trading Naamloze vennootschap, Belgium

Publication: 2012-11-21

Filed: 2012-02-17

Status: application

Gemstone of natural diamond, characterised in that the gemstone has two parallel faces in which the geometric plane that coincides with the aforementioned faces defines the volume of the gemstone, and from which a number of facets start, and each facet is parallel to an opposite facet or parallel to a connecting edge of two other facets.

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### **US8309205: Single crystal diamond elements having convex surfaces and methods of its fabrication**

Applicant: Element Six Limited, United Kingdom

Publication: 2012-11-13

Filed: 2006-07-07

Status: granted

A single crystal diamond element having a convex surface is disclosed, the convex surface including a spherical segment for which the maximum peak to valley deviation from a perfect spherical surface is less than about  $5\frac{1}{4}\mu\text{m}$ . Alternatively or in addition, the RMS deviation from a perfect spherical surface may be less than about 500 nm, or the RMS roughness less than about 30 nm. A single crystal diamond element with a radius of curvature less than about 20 mm is also disclosed. In one aspect a single crystal diamond element having a conical half-angle greater than about  $10^\circ$  is described. The invention also provides a method for forming a rotationally symmetrical surface on a single crystal diamond element, comprising rotating the element about a first axis, applying a laser beam to the element in a direction perpendicular to the first axis, and translating the laser beam in two dimensions in a plane perpendicular to the direction of the beam. If the two-dimensional path follows the arc of a circle a spherical surface may be formed. The invention also provides improving a spherical surface on a single crystal diamond element by pressing a rapidly rotating cup onto a slowly rotating element. The element may be a lens, in particular a solid immersion lens.

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### **US8307782: Deposition apparatus and deposition method**

Applicant: Kochi Industrial Promotion Center, Casio Computer, Japan  
Publication: 2012-11-13  
Filed: 2008-12-23  
Status: granted

A deposition apparatus includes: a first electrode for placing a processing object; a second electrode for generating plasma with the first electrode, the second electrode being opposed to the first electrode; and a cooling part for cooling the processing object, wherein between the processing object and the cooling part, as compared with a thermal resistance between a central part of the processing object and the cooling part, a thermal resistance between a peripheral part peripheral to the central part and the cooling part is small.

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**JP2012135718A2: Method for manufacturing diamond**

Applicant: Vision Development  
Publication: 2012-07-19  
Filed: 2010-12-27  
Status: application

Problem to be solved: to provide a method for easily and efficiently synthesizing a diamond from an organic explosive by using a simple apparatus.  
Solution: In a method for manufacturing the diamond by exploding the explosive in a pressure container, the method for manufacturing the diamond is characterized by including a process for exploding the explosive under a condition covering the explosive with ice.

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**EP2516701A1: Synthetic CVD diamond**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-10-31  
Filed: 2010-12-15  
Status: application

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**EP2526220A1: CVD single crystal diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-11-28  
Filed: 2011-01-14  
Status: application

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**EP2516700A1: Single crystal diamond material**

Applicant: Element Six Limited, United Kingdom  
Publication: 2012-10-31  
Filed: 2010-12-15

Status: application

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