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## **US7157067: Tough diamonds and method of making thereof**

Applicant: Carnegie inst of Washington (US)  
Publication: 2007-01-02  
Filed: 2004-07-13  
Status: granted

A single crystal diamond grown by microwave plasma chemical vapor deposition has a hardness of 50–90 GPa and a fracture toughness of 11–20 MPa m<sup>1/2</sup>. A method for growing a single crystal diamond includes placing a seed diamond in a holder; and growing single crystal diamond at a temperature of about 1000° C. to about 1100° C. such that the single crystal diamond has a fracture toughness of 11–20 MPa m<sup>1/2</sup>

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## **US20060292302A1: Apparatus and method for growing a synthetic diamond**

Applicant: -  
Publication: 2006-12-28  
Filed: 2005-06-24  
Status: application

Disclosed herein is an apparatus and method for growing a synthetic diamond. The apparatus for growing a synthetic diamond comprises: a reaction area contained with a high pressure, high temperature apparatus; and a means for pulling a vacuum on the reaction area. The method for growing a synthetic diamond includes the steps of using a reaction area contained within a high pressure, high temperature apparatus; and pulling a vacuum on the reaction area.

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## **US20060288927A1: System and high pressure, high temperature apparatus for producing synthetic diamonds**

Applicant: -  
Publication: 2006-12-28  
Filed: 2005-06-24  
Status: application

An apparatus for growing a synthetic diamond comprises a growth chamber, at least one manifold allowing access to the growth chamber, and a plurality of safety clamps positioned on opposite sides of the growth chamber; wherein the growth chamber and the plurality of safety clamps are comprised of a material having a tensile strength of about 120,000-200,000 psi, a yield strength of about 100,000-160,000 psi, an elongation of

about 10-20%, an area reduction of about 40-50%, an impact strength of about 30-40 ft-lbs, and a hardness greater than 320 BHN.

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**JP2006208207A2: Indicating plate equipped with precious stone-like index parts**

Applicant: Citizen Seimitsu Co Ltd  
Publication: 2006-08-10  
Filed: 2005-01-28  
Status: application

**PROBLEM TO BE SOLVED:** To provide an indicating plate capable of performing diversifying of design and high-class feeling at low cost, by forming index parts by replacing the pedestal parts with high-class precious stone to the precious stone-like specification in indicating plate placing index parts on the top surface of a dial substrate.

**SOLUTION:** The index parts consist of a index substrate and a translucency decorating member (transparent resin, coloring transparent resin, clear glass, and coloring clear glass and the like). The index substrate is treated by applying cut pattern with precious stone cut geometry. Both the index substrate and the translucency decorating member are carried out by surface processing. Since bulk production is possible, the indicating plate equipped with index parts can be provided with uniform quality at low cost.

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**JP2006206335A2: Method of producing diamond**

Applicant: Takahashi Nobuyuki / Katsuyama Kouhachiro  
Publication: 2006-08-10  
Filed: 2005-01-25  
Status: application

**PROBLEM TO BE SOLVED:** To provide a method capable of producing a diamond having a crystal structure similar to that of a natural diamond without using an expensive and special production device.

**SOLUTION:** The method of producing the diamond comprises: a step A for producing a cinder-like carbonized material by heating tar generated when burning timbers such as pine or cedar after pouring them into a kettle; a step B for crushing the cinder-like carbonized material obtained by the step A, charging the crushed material into methylene iodide to remove a supernatant liquid, taking out a precipitate sedimented in methylene iodide, washing by water, and selecting only black polyhedral crystals from the precipitate; and a step C for heating the polyhedral crystals obtained by the step B at a temperature of 400 to 600°C under normal pressures without pressurizing until obtaining a water-white crystal. When producing the diamond having a size of approximately one carat, the heating time of the step C is about two years.

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**JP2006181644A2: Cutting method for diamond and diamond obtained by the same**

Applicant: Tokyo Shinju KK  
Publication: 2006-07-13  
Filed: 2003-02-13  
Status: application

PROBLEM TO BE SOLVED: To provide a cutting method for diamond, exhibiting stronger brilliance and observing a heart-and-arrow phenomenon and diamond obtained by the same.

SOLUTION: Five pavilion main facets are formed so that a position shifted from the ridge line of a crystal shape on the pavilion formation side by about 15° is a ridge line in a diamond raw ore, and with reference thereto, ten pavilion main facets are formed. On the pavilion side of diamond, the ten pavilion main facets are formed around an acute angle curette, and twenty lower girdle facets are formed between them.

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**JP2006219370A2: Apparatus and method for diamond production**

Applicant: Carnegie Institution of Washington / UAB Research Foundation  
Publication: 2006-08-24  
Filed: 2006-04-26  
Status: application

PROBLEM TO BE SOLVED: To provide an apparatus and a method for producing a single-crystal diamond at a growth rate greater than about 1 μm per hour.

SOLUTION: The method for producing the diamond comprises a step wherein the diamond is arranged in a holder so that it makes a thermal contact with a side surface of the diamond adjacent to an edge of a growth surface of the diamond, a step wherein the temperature of the growth surface of the diamond is measured to provide temperature measurement values, a step wherein the temperature of the growth surface is controlled based upon the temperature measurement values and a step wherein the single-crystal diamond is grown by microwave plasma chemical vapor deposition on the growth surface. Here, the growth rate of the diamond is greater than 1 μm per hour

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**JP2006225208A2: Highly dispersible single crystal diamond fine powder and its producing method**

Applicant: Ishizuka Hiroshi  
Publication: 2006-08-31  
Filed: 2005-02-18  
Status: application

PROBLEM TO BE SOLVED: To provide a diamond fine powder which has excellent polishing performance and hardly forms rigid agglomerates and which has a D50 value of <50 nm.

SOLUTION: 1. The diamond fine powder is an assembly of single crystal diamond particles in which the D50 value is <50 nm. A portion of the surface of each particle is

converted into carbon having a non-diamond structure, and the carbon having the non-diamond structure, which is formed in heating operation, is disposed between the particles. 2. A method for producing the diamond fine particles comprises pulverizing a single crystal raw material diamond with a mechanical impact-crushing means, then obtaining the diamond fine powder having a D50 value of <50 nm in a precise classification process, sticking a carbon generating agent on the particle surface by dipping the particles into a solution or a dispersion of the carbon generating agent, and heating the particles at 800-1,400°C in an inert atmosphere. At this time, the carbon having the non-diamond structure, previously formed or formed from the carbon generating agent in situ, is used as a separation agent between the diamond particles, and thereby, the agglomeration of the particles is effectively avoided.

**US20070005486A1: Process for verifying, labeling and rating diamonds and other gemstones from mine to market**

Applicant: -  
Publication: 2007-01-04  
Filed: 2006-05-17  
Status: application

The present invention is a process for verifying, labeling and rating diamonds and other gemstones from mine to market to show country of origin, compliance with the Kimberley Processes and the quality rating of the diamonds or other gemstones. The process also provides for a review and verification of the outside audit and associated quarterly reviews by the outside auditor of the internal control processes of the mines, the Sightholders and the cutters and polishers of the diamonds or other gemstones.

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**US20070006616A1: Diamond cut**

Applicant: -  
Publication: 2007-01-11  
Filed: 2006-07-03  
Status: application

A new method of cutting a gemstone such as a diamond, known as the "Galush" cut, is provided. According to an embodiment of the invention, the "Galush" cut gemstone has a crown portion, a pavilion portion and a girdle portion provided between the crown portion and pavilion portion. The crown portion includes an upper surface having a shape configured by first, second and third boundaries, which form a perimeter around the crown of the gemstone. Each of the first and second boundaries has first and second ends, and the third boundary is arc-shaped having first and second edges. The first and second edges of the arc-shaped boundary adjoin the first end of each of the first and second boundaries and the second end of each of the first and second boundaries meet at a common tip.

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**US20070017437A1: Grown diamond mosaic separation**

Applicant: -  
Publication: 2007-01-25  
Filed: 2005-07-21  
Status: application

The present invention provides in one example embodiment a synthetic diamond and a method of growing such a diamond on a plurality of seed diamonds, implanting the grown diamond with ions, and separating the grown diamond from the plurality of seed diamonds

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**US20070020403A1: Process for producing extremely flat microcrystalline diamond thin film by laser ablation method**

Applicant: Japan Science and Technology Agency, Kawaguchi-shi, Japan  
Publication: 2007-01-25  
Filed: 2004-03-22  
Status: application

Diamond thin films deposited by known PLD processes are composed of diamond crystal grains with a size of about 1  $\mu\text{m}$  and have an irregular surface. A process for producing an ultraflat nanocrystalline diamond thin film by laser ablation includes creating atomic hydrogen and a supersaturated state of carbon in a space between a target and a substrate in a hydrogen atmosphere inside a reaction chamber at a substrate temperature of 450° C. to 650° C., a laser energy of 100 mJ or more, and a target-substrate distance of 15 to 25 mm to enable the growth of an ultraflat, single-phase nanocrystalline diamond thin film containing substantially no non-diamond component. The hydrogen atmosphere has a sufficient pressure to selectively completely etch off sp<sup>2</sup> bond fractions (graphite fractions) deposited on the substrate with sp<sup>3</sup> bond fractions remaining.

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**WO07002402A2: An apparatus and method for growing a synthetic diamond**

Applicant: The Gemesis Corporation, United States of America  
Publication: 2007-01-04  
Filed: 2006-06-23  
Status: application

Disclosed herein is an apparatus and method for growing a synthetic diamond. The apparatus for growing a synthetic diamond comprises: a reaction area contained with a high pressure, high temperature apparatus; and a means for pulling a vacuum on the reaction area. The method for growing a synthetic diamond includes the steps of using a reaction area contained within a high pressure, high temperature apparatus; and pulling a vacuum on the reaction area.

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**WO07007126A1: Single crystal diamond elements having convex surfaces and methods of its fabrication**

Applicant: Element Six Limited, United Kingdom  
Publication: 2007-01-18  
Filed: 2006-07-07  
Status: application

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  $\mu\text{m}$ . 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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**WO07009037A1: Structures Formed In Diamond**

Applicant: Apollo Diamond, Inc. United States of America  
Publication: 2007-01-18  
Filed: 2006-07-11  
Status: application

N-V centers in diamond are created in a controlled manner. In one embodiment, a single crystal diamond is formed using a CVD process, and then annealed to remove N-V centers. A thin layer of single crystal diamond is then formed with a controlled number of N-V centers. The N-V centers form Qubits for use in electronic circuits. Masked and controlled ion implants, coupled with annealing are used in CVD formed diamond to create structures for both optical applications and nanoelectromechanical device formation. Waveguides may be formed optically coupled to the N-V centers and further coupled to sources and detectors of light to interact with the N-V centers.

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**EP1741360A1: Oval Cut Diamond**

Applicant: Hohoemi Brains, Inc., Tokyo, Japan  
Publication: 2007-01-10  
Filed: 2005-03-25  
Status: application

An oval-cut diamond comprises a girdle having a contour line in an oval or oval-like shape, a crown above the girdle having an octagonal table facet on a top of it and a pavilion below the girdle. That is a modified oval brilliant cut diamond, in which one of the crown and the pavilion is rotated by about a sixteenth revolution around its central axis from an ordinary brilliant cut diamond. The girdle is of a ratio (b/a) of a short radius to a long radius of 0.6 or more, in which a radius in long axis direction is "a", and a radius in short axis direction is "b". A pair of pavilion main facets positioned opposite to each other with respect to the central axis has a pair of crown main facets or star facets facing the pair of pavilion main facets through the girdle. The two pavilion main facets, the two crown main facets or star facets and the table facet have a common vertical plane within the facets so that brilliancy of reflection lights coming out of the table facet and crown facets is enhanced.

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**EP1741359A1: Oval Cut Diamond**

Applicant: Hohoemi Brains, Inc., Tokyo, Japan  
Publication: 2007-01-10  
Filed: 2005-03-25  
Status: application

An oval-cut diamond comprises a girdle having a contour line in an oval or oval-like shape, a crown above the girdle having an octagonal table facet on a top of it and a pavilion below the girdle. The girdle is of a ratio (b/a) of a short radius to a long radius of 0.6 or more, in which a radius in long axis direction is "a", and a radius in short axis direction is "b". A pair of pavilion main facets positioned opposite to each other with respect to a central axis has a pair of crown main facets or star facets facing the pair of pavilion main facets through the girdle. The two pavilion main facets, the two crown main facets or star facets and the table facet have a common vertical plane within the facets so that brilliancy of reflection lights coming out of the table facet and crown facets is enhanced.

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**EP1238823B1: Process for covering bodies with diamond patterns and machine**

Applicant: Daisy s.r.l., 36016 Thiene (Vicenza), Italy  
Publication: 2007-01-31  
Filed: 2001-11-15  
Status: application

Processes for diamond covering bodies of substantially spherical or anyhow prismatic shape being used in jewelry, of the type which does not require removal of material are described. The single object is deposited within a seat which acts as a container and is successively subjected to a punching action. The process is characterized by the fact that the single object is automatically positioned at each punching action with a different portion of the surface of the object to be diamond covered.

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**USD535582: Precious stone**

Applicant: Nippon Star naamloze vennootschap, Antwerpen, Belgium  
Publication: 2007-01-23  
Filed: 2005-09-28  
Status: granted

I claim the ornamental design for a precious stone, as shown.

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**JP2006247135A2: Jewel**

Applicant: Niei Shokai:KK  
Publication: 2006-09-21  
Filed: 2005-03-10  
Status: application

PROBLEM TO BE SOLVED: To provide a jewel with a water clear diamond which is changed to a blue fluorescent colored diamond as the fluorescent diamond is irradiated with blue light of LED of specific wavelength.

SOLUTION: In a jewel 1, a fluorescent diamond 3 is irradiated with blue light of LED 4 of 400-410 nm wavelength, then, the water clear diamond is changed to a blue fluorescent colored diamond.

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**WO07018555A2: Ultra tough CVD single crystal diamond and three dimensional growth thereof**

Applicant: Carnegie Institution of Washington, United States of America  
Publication: 2007-02-15  
Filed: 2005-09-09  
Status: application

The invention relates to a single-crystal diamond grown by microwave plasma chemical vapor deposition that has a toughness of at least about 30 MPa m<sup>1/2</sup>. The invention also relates to a method of producing a single-crystal diamond with a toughness of at least about 30 MPa m<sup>1/2</sup>. The invention further relates to a process for producing a single crystal CVD diamond in three dimensions on a single crystal diamond substrate.

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**WO07014032A1: Separation of grown diamond from diamond seeds mosaic**

Applicant: Apollo Diamond, Inc., United States of America  
Publication: 2007-02-01  
Filed: 2006-07-21  
Status: application

The present invention provides in one example embodiment a synthetic diamond and a method of growing such a diamond on a plurality of seed diamonds, implanting the



grown diamond with ions, and separating the grown diamond from the plurality of seed diamonds.

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**US20070043587A1: Systems and methods for evaluating the appearance of a gemstone**

Applicant: -  
Publication: 2007-02-22  
Filed: 2006-08-16  
Status: application

Of the “four C's,” cut has historically been the most complex to understand and assess. This application presents a three-dimensional mathematical model to study the interaction of light with a fully faceted, colorless, symmetrical round-brilliant-cut diamond. With this model, one can analyze how various appearance factors (brilliance, fire, and scintillation) depend on proportions. The model generates images and a numerical measurement of the optical efficiency of the round brilliant-called DCLR—which approximates overall fire. DCLR values change with variations in cut proportions, in particular crown angle, pavilion angle, table size, star facet length, culet size, and lower girdle facet length. The invention describes many combinations of proportions with equal or higher DCLR than “Ideal” cuts, and these DCLR ratings may be balanced with other factors such as brilliance and scintillation to provide a cut grade for an existing diamond or a cut analysis for prospective cut of diamond rough.

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**US20070038530A1: Gemstone certificate production and delivery system**

Applicant: -  
Publication: 2007-02-15  
Filed: 2006-10-23  
Status: application

This invention is a method for delivering, viewing and printing an electronic gemstone certificate to a remote computer or PC via the internet. When the gemstone, diamond or jewelry piece reaches the final retail store, a unique identification number is entered into interactive report viewer software, and the corresponding electronic versions of the reports are electronically downloaded to the PC and its viewer software. The electronic report includes data and images from lab reports, light performance reports, or a combination thereof. The PC can print paper facsimiles of the electronic report for use in the retail sale of the piece, or the PC can order a high quality, formal printed report for delivery to the retail outlet or the end consumer. The formal printed report can include all or a portion of the data and images for one or both the lab and light performance reports, or the combined report.

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**US20070036921A1: Diamond**

Applicant: -  
Publication: 2007-02-15  
Filed: 2006-07-06  
Status: application

A method of producing a CVD single crystal diamond layer on a substrate includes adding into a DVD synthesis atmosphere a gaseous source comprising silicon. The method can be used to mark the diamond material, for instance to provide means by which its synthetic nature can more easily be determined. It can also be exploited to generate single crystal diamond material of high colour.

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**US7172655: Colored diamond**

Applicant: -  
Publication: 2007-02-06  
Filed: 2003-09-05  
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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**EP1430291B1: Examining a diamond**

Applicant: Gersan Establishment, 9490 Vaduz, Liechtenstein  
Publication: 2007-02-14  
Filed: 2006-10-23  
Status: granted

Apparatus for automatically indicating a change in material within a gemstone diamond, comprising: means for irradiating the diamond with irradiation to stimulate the emission of luminescence; means for scanning the irradiation; means for automatically detecting the luminescence; means for automatically comparing luminescences so detected and thereby detecting a change in the material of which the diamond is composed; and means responsive to said comparing means for automatically indicating said change in material; characterized in that the irradiating means, scanning means and detecting means are provided in a confocal spectrometer arranged to carry out a confocal technique, whereby: the stimulating irradiation is capable of penetrating the whole depth of the diamond and is focusable at a focal plane within the depth of the diamond; the scanning means are arranged to scan the focal plane of the stimulating radiation right through the diamond; and the luminescence detecting means are arranged to sense the luminescences originating at different depths within the diamond by collecting the luminescences from the instantaneous focal planes; wherein the comparing means are arranged to compare the luminescences at the different focal planes.

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**EP1305608B1: Instrument for examining a gemstone**

Applicant: Gersan Establishment, 9490 Vaduz, Liechtenstein  
Publication: 2007-02-07  
Filed: 2001-07-17  
Status: granted

Gemstone examining instrument for determining whether polished gemstone is natural diamond, uses laser to irradiate gemstone submerged in cryogen in thermally insulated container and analyzes resulting photoluminescence spectra.

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**EP1648259A4: Precious stone cut and method of making**

Applicant: SO, David, United States of America  
Publication: 2007-02-07  
Filed: 2004-07-12  
Status: application

A stone cut and method for cutting a stone that increase the number of facets on the stone as well as the scintillation, brilliance, and light reflectivity of the stone. The cut and method includes cutting angles and increased number of facets that, either separately or together, manage the external and internal light flow dynamics of a round cut diamond to a higher level of efficiency, effectiveness, and performance. In accordance with another aspect of the invention, different cutting angles and proportions generate greater brilliance, dispersion, scintillation, and light reflectivity of the stone.

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**BE1016601AD: Precious, semi-precious or mineral cut stone and method for cutting same**

Applicant: Takehiko Sato Belgium  
Publication: 2007-02-06  
Filed: 2005-05-25  
Status: application

The invention concerns a precious, semi-precious or mineral cut stone, comprising a crown including in its center a planar table surrounded with several facets of the crown, a pavilion comprising a pointed culet and several pavilion facets, and between the crown and the pavilion, a girdle. The invention is characterized in that said pavilion facets comprise at least one top facet extending between said pointed culet and an intermediate location between the girdle and the culet.

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**JP2006218163A2: Jewel**

Applicant: Crane:KK, Karon:KK, Tani Ryoki  
Publication: 2006-08-24  
Filed: 2005-02-14  
Status: application

PROBLEM TO BE SOLVED: To provide a jewel capable of representing a sharp pattern when the jewel is seen from the side of a table.

SOLUTION: The jewel has a crown having the table on an upper face, a pavilion projecting downward in an approximate spindle shape, and a girdle between the pavilion and the crown. The girdle is arranged so that an upper border that is the lower end edge of the crown and a lower border that is an upper end edge of the pavilion are approximately in parallel, and that it meanders up and down in a circumferential direction, specially meanders up and down in a zigzag shape. The pavilion is cut sequentially from a lower end toward the girdle so as to form facets.

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**JP2006181644A2: Cutting method for diamond and diamond obtained by the same**

Applicant: Tokyo Shinju KK  
Publication: 2006-07-13  
Filed: 2003-02-13  
Status: application

PROBLEM TO BE SOLVED: To provide a cutting method for diamond, exhibiting stronger brilliance and observing a heart-and-arrow phenomenon and diamond obtained by the same.

SOLUTION: Five pavilion main facets are formed so that a position shifted from the ridge line of a crystal shape on the pavilion formation side by about 15° is a ridge line in a diamond raw ore, and with reference thereto, ten pavilion main facets are formed. On the pavilion side of diamond, the ten pavilion main facets are formed around an acute angle culet, and twenty lower girdle facets are formed between them.

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**JP03863374B2 Method for cutting diamond and proportion as well as aggregate**

Applicant: Shudo Hisatake  
Publication: 2002-07-30  
Filed: 2001-01-22  
Status: granted

PROBLEM TO BE SOLVED: To solve the problem that operability of cutting is wrong due to many cutting surfaces and a special shape cannot be formed with a plurality of aggregates in a conventional round brilliant cut diamond of a pentadecahedron.

SOLUTION: A method for cutting the diamond in its proportion comprises the steps of forming a table in a rectangular shape at the diamond having a pavilion at a lower part of the table, cutting the pavilion perpendicularly from each side of the table to form a lower girdle facet, and obliquely cutting from each corner of the table toward a central

direction to form a lower main facet. Thus, cutting surfaces are a little, and its operability is good. Further, since a rough is cut from a true center into two to form two having the same size, its economy is excellent. Its proportion is simple as a whole. Still, reflecting lights not only express in a peculiar shape pattern but also the aggregates of a peculiar shape can be formed at the diamond by using the plurality of aggregates.

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**JP2006219370A2: Apparatus and method for diamond production**

Applicant: Carnegie Institution of Washington UAB Research Foundation  
Publication: 2006-08-24  
Filed: 2006-04-26  
Status: application

**PROBLEM TO BE SOLVED:** To provide an apparatus and a method for producing a single-crystal diamond at a growth rate greater than about 1  $\mu\text{m}$  per hour.

**SOLUTION:** The method for producing the diamond comprises a step wherein the diamond is arranged in a holder so that it makes a thermal contact with a side surface of the diamond adjacent to an edge of a growth surface of the diamond, a step wherein the temperature of the growth surface of the diamond is measured to provide temperature measurement values, a step wherein the temperature of the growth surface is controlled based upon the temperature measurement values and a step wherein the single-crystal diamond is grown by microwave plasma chemical vapor deposition on the growth surface. Here, the growth rate of the diamond is greater than 1  $\mu\text{m}$  per hour.

**WO07029269A1: Synthesis of large homoepitaxial monocrystalline diamond**

Applicant: Rajneesh Bhandari  
Publication: 2007-03-15  
Filed: 2006-09-01  
Status: application

A method for producing a large homoepitaxial monocrystalline diamond. The method comprises placing at least two substrates in a substrate holder in a chemical vapor deposition (CVD) chamber. The substrates are positioned in such a manner that the growth faces of the substrates form a wedge. A diamond forming gas is provided adjacent to the substrates in the CVD chamber. The diamond forming gas is exposed to microwave radiation to generate a plasma. Then, the substrates are exposed to the plasma under such conditions that diamond growth occurs in the wedge between the substrates, to form a large homoepitaxial monocrystalline diamond.

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**US20070062917A1: Laser cutting and sawing method and apparatus**

Applicant: Quantronix Corporation, East Setauket, NY, United States of America  
Publication: 2007-03-22  
Filed: 2005-11-30  
Status: application

Laser cutting and sawing can be performed on a variety of materials, transparent or non-transparent, including quartz, sapphire, glass, semiconductors, and diamonds. By direct generation of a special laser beam from a laser cavity and/or by shaping of a laser beam, unique characteristics of the beam in X- and Y-axes are utilized in the cutting and sawing of materials. Such a method and apparatus can reduce breakage and weight loss of the processed material while maintaining or increasing the cutting/sawing throughput.

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**US20070056778A1: Sintered polycrystalline diamond material with extremely fine microstructures**

Applicant: -  
Publication: 2007-03-15  
Filed: 2006-09-13  
Status: application

A sintered polycrystalline diamond material (PCD) of extremely fine grain size is manufactured by sintering a diamond powder with pre-blended catalyst metal under high pressure/high temperature (HP/HT) processing. The PCD material has an average sintered diamond grain structure of less than 1.0  $\mu\text{m}$ .

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**US20070053823A1: Technique of production of fancy red diamonds**

Applicant: -  
Publication: 2007-03-08  
Filed: 2004-05-27  
Status: application

The invention relates to the treatment (enhancement) of diamonds in order to give them different colors and can be used by the gem and jewelry trade. The technique consists in producing isolated substitutional nitrogen atoms, or C centers, in the crystal lattice of natural near-colorless-to-brown type Ia diamonds containing A centers or in the crystal lattice of natural near-colorless high-nitrogenous type Ia diamonds containing over 800 ppm of nitrogen in the form of A and B1 centers. Natural type Ia diamonds containing A centers are HPHT-treated in a high-pressure apparatus at a temperature exceeding 2150° C. and under a stabilizing pressure of 6.0-7.0 GPa. Then they are irradiated with  $5 \cdot 10^{15}$ - $5 \cdot 10^{18} \text{ cm}^{-2}$  2-4 MeV electrons and finally annealed in a vacuum at a temperature exceeding 1100° C. Natural high-nitrogenous type Ia diamonds containing over 800 ppm of nitrogen in the form of A and B1 centers are irradiated with high-energy electrons with the irradiation dose over  $10^{19} \text{ cm}^{-2}$  and annealed in a vacuum at a temperature exceeding 1100° C. In this manner natural red diamonds with stable NV centers absorbing in the 400-to-640 nm range are produced.

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**US7193694: Method for grading gemstone cut and symmetry**

Applicant: -  
Publication: 2007-03-20  
Filed: 2005-05-02  
Status: granted

An apparatus and associated method for the direct and objective grading of the cut and symmetry of gemstones is provided. The apparatus comprises a laser, an integration sphere, and a gemstone holder, which together measure certain optical characteristics of the gemstone. Optionally, the gemstone holder mechanically rotates and the integration sphere connects to a data recorder such that a plurality of measurements may be recorded and analyzed. The associated method provides a method for interpretation of the data generated by the apparatus as the data relates to the cut quality and symmetry of the gemstone.

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**US7192337: Method for cutting diamond**

Applicant: Diana Sun Diamond Co., Ltd., Miyagi, Japan  
Publication: 2007-03-20  
Filed: 2006-02-15  
Status: granted

To provide a diamond rendering reflective light off a table goldenly brilliant by making a proportion thereof symmetrical at any place viewed from an upper face, a side face or a bottom face, a first reference line, a second reference line crossing the first reference lines at a right angle and third reference lines equally dividing segments defined by an intersection of the first reference line and the second reference line into four equal parts, respectively, are provided. A first arc line intersects these reference lines. An approximately regular hexadecagon shaped table is established by line segments defined between these first intersections of the reference lines with the first arc line. Fourth reference lines dividing sectors defined between the third reference lines into two equal parts and a second arc line concentric with and larger than the first arc line, are provided. Star facets are established by interconnecting intersections of the fourth reference lines and the second arc line with intersections of the first arc line and the first to third reference lines. Upper main facets are established by interconnecting intersections of the first to third reference lines with and an outermost arc line and intersections of the fourth reference lines and the second arc line, and intersections of the fourth reference lines and the second arc line with the first intersections.

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**US7183548: Apparatus for modifying and measuring diamond and other workpiece surfaces with nanoscale precision**

Applicant: Metadigm LLC, Berkeley, CA, United States of America  
Publication: 2007-02-27  
Filed: 2005-02-25  
Status: granted

Apparatus and techniques are provided for modifying and measuring surfaces of diamond workpieces and other workpieces with nanoscale precision. The apparatus and techniques exploit scanning probe microscopy (SPM) and atomic force microscopy (AFM) at a wide range of operating temperatures. In some embodiments, the SPM/AFM apparatus also includes an interferometric microscope and/or acoustic-wave microscope for making high-precision measurements of workpiece surfaces.

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**EP1764610A1: Improvements in gemstone viewing methods and apparatus**

Applicant: Overseas Diamonds Technologies N.V., 2018 Antwerpen, Belgium  
Publication: 2007-03-21  
Filed: 2005-09-14  
Status: application

Viewing apparatus for viewing a surface of a gemstone comprising an adjustable platform with a surface adapted to receive the gemstone, a viewing axis along which the gemstone is viewed, and a light source adapted to emit light substantially parallel to the viewing axis, the viewing apparatus characterised by: an alignment means comprising a plurality of misalignment indicators, the misalignment indicators arranged to provide three or more visually distinguishable zones around the viewing axis, the alignment means further comprising three or more adjustment indicators positioned relative to the platform and the misalignment indicators, wherein the adjustment indicators are associated with the visually distinguishable zones such that an image viewed along the viewing axis of one of the zones reflected off the surface of the gemstone provides an indication of which way to adjust the platform and the viewing axis relative to each other to make the surface of the gemstone and the viewing axis perpendicular to each other.

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**EP1214576B1: Viewer for gemstones**

Applicant: Wagner Randall, Schoeckert Kurt, United States of America  
Publication: 2007-04-04  
Filed: 2000-08-25  
Status: granted

A gemstone viewer comprising: a base having a gemstone holder in which a gemstone can be placed for viewing; a support mechanism coupled to the base for supporting a vertically adjustable mounting bracket and a light assembly mounted to the vertically adjustable mounting bracket, the light assembly positioned directly above the gemstone holder; and a light control structure placed on the base over the gemstone placed in the gemstone holder, the light control structure having an aperture formed in the centre thereof for allowing light from a light unit to pass therethrough and for viewing a gemstone placed in the gemstone holder wherein the light control structure is removable, opaque and shaped such as to create proper lighting angles.

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**EP1181875B1: Cut design of diamond for ornamental use**

Applicant: Hohoemi Brains, Inc., Osaka, Japan  
Publication: 2007-03-14  
Filed: 2001-08-03  
Status: granted

A cut design for diamonds having a crown of substantially a frustum shape and substantially a conic pavilion directly under the frustum part, the diamond being enhanced in the brilliancy and scintillation of its crown part, the brilliancy and scintillation twinkling, and bluish lights being returned as reflected lights. A crown angle  $c$  and a pavilion angle  $p$  are so determined that lights coming in crown facets and emitted from crown facets, lights coming in the table facet and emitted from the crown facets, and lights coming in the crown facets and emitted from the table facet be directed toward the observer at the same time. Further, it is preferable to determine the crown angle  $c$  and the pavilion angle  $p$  so that the angles formed by incident lights and emitted lights are substantially equal to each other. Its table diameter should be between or equal to 0.60 and 0.33, more preferably not more than 0.55 and even more preferably not more than 0.38, in its ratio to the girdle diameter.

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**US20070058775A1: System for and method of authenticating marked objects**

Applicant: -  
Publication: 2007-03-15  
Filed: 2005-09-13  
Status: application

Non-destructive analysis of a residue of a coating applied to a marked object is performed to authenticate the object.

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**WO07023444A2: A method for evaluation of a gemstone**

Applicant: Galatea Ltd., Israel  
Publication: 2007-03-01  
Filed: 2006-08-21  
Status: application

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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**EP1258029B1: Method for treating a diamond surface and corresponding diamond surface**

Applicant: Universite Pierre et Marie Curie, Paris, France  
Publication: 2007-03-21  
Filed: 2001-02-07  
Status: application

A treatment method of an insulating surface having a diamond structure, wherein: ions are produced, each having at least three positive charges, and a beam of said positive multicharged ions is sent towards the diamond surface, in order to make on at least one zone of said surface, a local structural modification enabling to make conductive said zone, each ion having a charge, a kinetic energy and an incidence such that the obtained structural modification extends on a surface area greater than four preferably greater than ten atomic surfaces of said diamond and smaller than 22,500 nm<sup>2</sup>.

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**JP2006206335A2: Method of producing diamond**

Applicant: Takahashi Nobuyuki, Katsuyama Kouhachiro  
Publication: 2006-08-10  
Filed: 2005-01-25  
Status: application

PROBLEM TO BE SOLVED: To provide a method capable of producing a diamond having a crystal structure similar to that of a natural diamond without using an expensive and special production device.

SOLUTION: The method of producing the diamond comprises: a step A for producing a cinder-like carbonized material by heating tar generated when burning timbers such as pine or cedar after pouring them into a kettle; a step B for crushing the cinder-like carbonized material obtained by the step A, charging the crushed material into methylene iodide to remove a supernatant liquid, taking out a precipitate sedimented in methylene iodide, washing by water, and selecting only black polyhedral crystals from the precipitate; and a step C for heating the polyhedral crystals obtained by the step B at a temperature of 400 to 600°C under normal pressures without pressurizing until obtaining a water-white crystal. When producing the diamond having a size of approximately one carat, the heating time of the step C is about two years.

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**US20070089458A1: Faceted gemstone**

Applicant: -  
Publication: 2007-04-26  
Filed: 2003-12-02  
Status: application

The invention relates to a gemstone having a surface at least part of which is polished, wherein the polished surface comprises a plurality of adjacent facets, and in that the polished surface area comprises 4-25 facets per mm<sup>2</sup> of surface area.

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**WO07038104A2: Laser cutting and sawing method and apparatus**

Applicant: Quantronix Corporation, United States of America  
Publication: 2007-04-05  
Filed: 2006-09-19  
Status: application

Laser cutting and sawing can be performed on a variety of materials, transparent or non-transparent, including quartz, sapphire, glass, semiconductors, and diamonds. By direct generation of a special laser beam from a laser cavity and/or by shaping of a laser beam, unique characteristics of the beam in X- and Y-axes are utilized in the cutting and sawing of materials. Such a method and apparatus can reduce breakage and weight loss of the processed material while maintaining or increasing the cutting/sawing throughput.

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**US20070083382A1: Systems and methods for evaluating the appearance of a gemstone**

Applicant: -  
Publication: 2007-04-12  
Filed: 2006-09-01  
Status: application

Of the "four C's," cut has historically been the most complex to understand and assess. This application presents a three-dimensional mathematical model to study the interaction of light with a fully faceted, colorless, symmetrical round-brilliant-cut diamond. With this model, one can analyze how various appearance factors (brilliance, fire, and scintillation) depend on proportions. The model generates images and a numerical measurement of the optical efficiency of the round brilliant-called DCLR-which approximates overall fire. DCLR values change with variations in cut proportions, in particular crown angle, pavilion angle, table size, star facet length, culet size, and lower girdle facet length. The invention describes many combinations of proportions with equal or higher DCLR than "Ideal" cuts, and these DCLR ratings may be balanced with other factors such as brilliance and scintillation to provide a cut grade for an existing diamond or a cut analysis for prospective cut of diamond rough.

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**US20070079752A1: Coloured diamond**

Applicant: -  
Publication: 2007-04-12  
Filed: 2006-12-14  
Status: application

A method of producing a single crystal CVD diamond of a desired colour which includes the steps of providing single crystal CVD diamond which is coloured and heat treating

the diamond under conditions suitable to produce the desired colour. Colours which may be produced are, for example, in the pink-green range.

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**US7207864: Polishing apparatus**

Applicant: Ebara Corporation, Tokyo, Japan  
Publication: 2007-04-24  
Filed: 2006-03-23  
Status: granted

The present invention relates to a polishing apparatus for polishing a workpiece, such as a semiconductor wafer, to a flat mirror finish. The polishing apparatus comprises a polishing table having a polishing surface, and a top ring, and the workpiece is interposed between the polishing table and the top ring and pressed at a predetermined pressure to polish the workpiece. The polishing apparatus comprises at least two dressing units for dressing the polishing surface by being brought into contact with the polishing surface, which is a surface of a polishing cloth.

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**CA2316812C: Examining diamonds and gemstones**

Applicant: Gersan Establishment, Liechtenstein  
Publication: 2007-03-20  
Filed: 1998-12-23  
Status: granted

Viewing apparatus for viewing mark on facet of diamond

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**JP2006327862A2: Method for manufacturing single crystal**

Applicant: **National Institute of Advanced Industrial & Technology**  
Publication: 2006-12-07  
Filed: 2005-05-26  
Status: application

Problem to be solved: To provide a method capable of obtaining a large-sized diamond single crystal comparatively in a short time at a low cost in manufacturing a single crystal by an epitaxial growth method, especially a diamond single crystal by a vapor-phase synthesis method.

Solution: In an epitaxial growth method where (100) face of a single crystal preferentially grows, the crystal is grown on {100} substrate of the single crystal, a surface parallel to the other {100} face different from {100} face along the growing direction is formed at the side face of the grown crystal, and the crystal is grown on the formed {100} face, where the processes and are carried out once or more times. As a support of the diamond single crystal, a support made of a metal having a crystal mounting part shaped into a protruded form against the outer rim of the support, placed apart from the outer rim of the support, and formed into a recessed shape is used.

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**JP03863374B2**

Applicant: -  
Publication: 2006-12-27  
Filed: 2001-01-22  
Status: granted

Diamond cutting method involves forming pavilion continuously to table by vertical cutting from table sides to define lower-girdle facets and by oblique cutting from table corners to form lower-main facets

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**WO07048331A1: A method of adjusting colors of trapeziform and triangular stones**

Applicant: -  
Publication: 2007-05-03  
Filed: 2006-10-23  
Status: application

A method of adjusting colors of trapeziform and triangular stones, which is achieved with a curving crest, a plain surface (an arc surface, a convex surface), and of a Qianxigong trapezium or triangle. Reflective lights of stones derived from a middle border angle, a small facet of a crown, a small facet of a pavilion and a top facet are adjusted into angles for easy view. Brightness of stones is dispersed in a wide range or is focused in a narrow range by designing the top facet to be a curving crest, which is formed by connecting several small facets, designing the crown of the stone to be a plain surface (an arc surface, a convex surface), or using the method of Qianxigong at the small facet and (or) the top facet, so that brightness of any point in angles for easy view can be adjusted. Thus, colors of stones can become deep, light, pastel obviously or keep exactly, that is easy to satisfy the angle of view.

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**DE60127210C0: Diamantschliff für Schmuckzwecke**

Applicant: Hohoemi Brains Inc., Japan  
Publication: 2007-04-26  
Filed: 2001-08-03  
Status: granted

Ornamental diamond cut design with facets above and below girdle

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**US20070113586A1: Modified princess cut diamond having hearts and arrows pattern and method**

Applicant: -  
Publication: 2007-05-24  
Filed: 2005-11-23  
Status: application

A modified princess cut diamond and method of forming a modified princess cut diamond into a symmetrical shape possessing a hearts and arrows pattern characteristic of the true hearts and arrows pattern in a round cut diamond. The modified princess cut diamond includes: a tablet facet, 4 main crown facets, 8 crown halves, 8 crown star facets, 4 subsidiary crown facets, 8 subsidiary crown halves, 8 main pavilion facets, 4, subsidiary pavilion facets, 16 pavilion halves, a girdle and 4 subsidiary cut corner girdle facets with each main crown facet having a pair of crown star facets symmetrically disposed on one side thereof adjacent to the tablet facet and a pair of crown halves symmetrically disposed on the opposite side thereof with each pair of crown star facets having the side thereof adjoining the table facet meeting at a point equal to essentially half the longer distance of the main crown facet measured horizontally and with all crown star facets and crown halves adjacent each main crown having identical polished angles with a maximum tolerance of 0.3°.

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**WO07059251A2: New diamond uses/applications based on single-crystal cvd diamond produced at rapid growth rate**

Applicant: Carnegie Institution of Washington, United States of America  
Publication: 2007-05-24  
Filed: 2006-11-15  
Status: application

The present invention is directed to new uses and applications for colorless, single-crystal diamonds produced at a rapid growth rate. The present invention is also directed to methods for producing single crystal diamonds of varying color at a rapid growth rate and new uses and applications for such single-crystal, colored diamonds.

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**WO07052161A2: Improvements in gemstone viewing methods and apparatus**

Applicant: Overseas Diamonds Technologies N.V., Belgium  
Publication: 2007-05-10  
Filed: 2006-09-13  
Status: application

Viewing apparatus for viewing a surface of a gemstone comprising an adjustable platform with a surface adapted to receive the gemstone, a viewing axis along which the gemstone is viewed, and a light source adapted to emit light substantially parallel to the viewing axis, the viewing apparatus characterised by: an alignment means comprising a plurality of misalignment indicators, the misalignment indicators arranged to provide

three or more visually distinguishable zones around the viewing axis, the alignment means further comprising three or more adjustment indicators positioned relative to the platform and the misalignment indicators, wherein the adjustment indicators are associated with the visually distinguishable zones such that an image viewed along the viewing axis of one of the zones reflected off the surface of the gemstone provides an indication of which way to adjust the platform and the viewing axis relative to each other to make the surface of the gemstone and the viewing axis perpendicular to each other.

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**EP1456436B1: Method for producing particles with diamond structure**

Applicant: Max-Planck-Gesellschaft zur Förderung der Wissenschaften, Germany  
Publication: 2007-05-16  
Filed: 2002-11-22  
Status: granted

The present invention relates to a method for producing particles having a monocrystalline diamond structure and in particular to a method for vapor-growing of diamond particles under plasma conditions.

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**WO07059090A2: Engraved gemstone viewer**

Applicant: Gemex Systems, Inc. United States of America  
Publication: 2007-05-24  
Filed: 2006-11-13  
Status: application

The present invention is an engraved gemstone viewer for viewing a flat, smooth surface of a gemstone that has been micro or nano etched with an inscription such as an identification number. The gemstone is mounted on a piece of jewelry or can remain unmounted when placed inside or otherwise received by the viewer. A source of light directs a light beam toward a magnifying lens coated with a reflection enhancing coating. The lens reflects the light beam along a path incident to the surface of the gemstone containing the inscription. The smooth flat gemstone surface spectrally reflects the light beam along a path back toward the magnifying lens, which produces a viewable light image that reveals the inscription. The inscription is shown as a dark or lightless region of the light image.

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**JP2007083311A2:**

Applicant: -  
Publication: 2007-04-05  
Filed: 2006-12-13  
Status: application

Laser system for marking gemstones for subsequent authentication - has laser and cameras used to perform micro-inscribing and recording of gem details for later comparison and certification

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**JP03863374B2: Diamond cutting method, enneahedral-cut diamonds and assembly of enneahedral-cut diamonds**

Applicant: -  
Publication: 2006-12-27  
Filed: 2001-01-22  
Status: granted

Disclosed is a diamond cutting method comprising the steps of: forming a square or rectangular table in a piece of gemstone; and forming a pavilion continuous to the table by cutting vertically from each side of the square or rectangular table to define the four lower-girdle facets and by cutting obliquely from each corner of the square or rectangular table to the culet of the pavilion to form four lower-main facets, whereby the upper opposite sides of each lower-main facet adjoining the adjacent lower-girdle facets whereas the lower opposite sides of each lower-main facet adjoining the confronting lower opposite sides of the adjacent lower-main facets. An enneahedral-cut diamond thus produced is a table-and-pavilion structure, permitting plural diamonds to be arranged side by side as a whole with their square or rectangular tables directed inward or outward.

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**JP2007012073A2: Processing method for verifying, labeling and rating diamond and other gemstone from mine to market**

Applicant: Collectors Universe Inc  
Publication: 2007-01-18  
Filed: 2006-06-30  
Status: application

Problem to be solved: To provide an adjusted and reliable processing method for verifying, labeling and rating diamonds and other gemstones from mine to market to show country of origin, compliance with the Kimberley Processes and the quality rating of the diamonds or other gemstones.

Solution: This invention is a process for verifying, labeling and rating diamonds and other gemstones from mine to market to show country of origin, compliance with the Kimberley Processes and the quality rating of the diamonds or other gemstones. The process also provides for a review and verification of the outside audit and associated quarterly reviews by the outside auditor of the internal control processes of the mines, the sightholders and the cutters and polishers of the diamonds or other gemstones.

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**US7228856: Diamond cutting method and diamond provided by the method**

Applicant: Tokyo Shinzyu Co., Ltd. Japan  
Publication: 2007-06-12  
Filed: 2004-02-12  
Status: granted

Ten of pavilion main facets are formed with reference to the previously formed five of first pavilion main facets in which an initial first main facet is formed in a position centered on a line shifted approximately fifteen degrees from the ridge of the raw diamond on the pavilion side. Ten of pavilion main facets 19 radiate from the culet 18 and twenty of lower girdle facets are formed between the adjacent pavilion main facets on the pavilion side of the diamond.

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**US7228602: Method of encapsulating material from humans or animals in a natural gemstone and its product**

Applicant: Alberta Ltd., Edmonton, Alberta, Canada  
Publication: 2007-06-12  
Filed: 2004-02-25  
Status: granted

A method of creating a diamond includes the steps of creating entry points and internal passages in a natural or synthetic diamond, infiltrating a mixture comprising ashes produced from living human and animal parts or deceased human or animal parts into the diamond, and crystallizing the mixture. The diamond may then be repolished or refaceted. The invention also includes diamonds having discrete internal portions comprising ashes made from living human and animal parts, which internal portions are substantially transparent and which have an index of refraction substantially matching that of the diamond.

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**US7225642: Diamond cut**

Applicant: Simka Diamonds, New York, NY, United States of America  
Publication: 2007-06-05  
Filed: 2003-09-09  
Status: granted

A brilliant gemstone cut, having a crown, a girdle and a pavilion. The crown has a flat table shaped as an equilateral n-sided polygon. The girdle is also multi sided polygon. The corner, lower girdle, bezel and star facets are at significantly angles of inclination, with respect to the table to provide significantly improved brilliance.

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**US7225641: Cut design of diamonds providing plenty of visual-perceptible reflection for ornamental use and observation method thereof**

Applicant: Hohoemi Brains, Inc. Japan  
Publication: 2007-06-05  
Filed: 2003-01-23  
Status: granted

A cut design of an ornamental diamond and an observation method of the diamond which an observer can perceive a more beauty, are disclosed. The cut design is a round brilliant cut comprising a girdle, a crown above the girdle and a pavilion below the girdle. A girdle height (h) is 0.026 to 0.3 times a girdle radius, a pavilion angle (p) of a pavilion main facet ranges from 37.5 degrees to 41 degrees, and a crown angle (c) of a crown main facet is within a range of satisfying:  $c > -2.8667xp + 134.233$  and  $p < \frac{1}{4}x \{(\text{SIN}^{-1}(1/n) + \sin^{-1}(1/n \cdot \sin c)) \times 180/\pi + 180 - 2c\}$ , wherein n: refraction index of a diamond, pi: circular constant, p: pavilion angle in degrees, and c: crown angle in degrees. The cut design of the ornamental diamond provides an observer with plenty of visual-perceptible reflection when the observer watches the diamond above a table facet with a sight line of an angle less than 20 degrees with a vertical line at the center of the table facet.

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**WO07069242A1: Assessment of diamond color**

Applicant: Platform Development & Investment Ltd. Israel  
Publication: 2007-06-21  
Filed: 2006-12-12  
Status: application

Disclosed are methods and devices for assessing the colors of diamonds. In embodiments, the color of finished diamonds cut from a given rough diamond is assessed by analyzing the effect on light interacting with the rough diamond to give a reasonable (that is to say commercially significant) assessment of the color quality of the finished diamond.

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**WO07067696A1: Enhancing the optical characteristics of a gemstone**

Applicant: California Institute Of Technology United States of America  
Publication: 2007-06-14  
Filed: 2006-12-06  
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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**WO07066215A2: High crystalline quality synthetic diamond**

Applicant: Element Six Technologies (Pty) Ltd South Africa  
Publication: 2007-06-14  
Filed: 2006-12-08  
Status: application

The invention relates to a single crystal CVD diamond material, wherein the extended defect density as characterised by X-ray topography is less than 400 /cm<sup>2</sup> over an area of greater than 0.014 cm<sup>2</sup>. The invention further relates to a method for producing a CVD single crystal diamond material according to any preceding claim comprising the step of selecting a substrate on which to grow the CVD single crystal diamond, wherein the substrate has at least one of a density of extended defects as characterised by X-ray topography of less than 400 /cm<sup>2</sup> over an area greater than 0.014 cm<sup>2</sup>; an optical isotropy of less than  $1 \times 10^{-5}$  over a volume greater than 0.1 mm<sup>3</sup>; and a FWHM X-ray rocking curve width for the (004) reflection of less than 20 arc seconds.

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**US20070148374A1: Method of incorporating a mark in cvd diamond**

Applicant: -  
Publication: 2007-06-28  
Filed: 2004-12-10  
Status: application

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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**US20070148080A1: Lower pressure synthesis of diamond material**

Applicant: The Penn State Research Foundation, United States of America  
Publication: 2007-06-28  
Filed: 2006-12-20  
Status: application

Methods of synthesizing a diamond material, particularly nanocrystalline diamond, diamond-like carbon and bucky diamond are provided. In particular embodiments, a composition including a carbon source, such as coal, is subjected to addition of energy, such as high energy reactive milling, producing a milling product enriched in

hydrogenated tetrahedral amorphous diamond-like carbon compared to the coal. A milling product is treated with heat, acid and/or base to produce nanocrystalline diamond and/or crystalline diamond-like carbon. Energy is added to produced crystalline diamond-like carbon in particular embodiments to produce bucky diamonds.

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**US20070148079A1: Thick single crystal diamond layer method for making it and gemstones produced from the layer**

Applicant: -  
Publication: 2007-06-28  
Filed: 2006-07-14  
Status: application

Layer of single crystal CVD diamond of high quality having a thickness greater than 2 mm. Also provided is a method of producing such a CVD diamond layer.

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**US7235130: Apparatus and method for diamond production**

Applicant: Carnegie Institution of Washington, United States of America  
The UAB Research Foundation, United States of America  
Publication: 2007-06-26  
Filed: 2005-01-27  
Status: application

An apparatus for producing diamond in a deposition chamber including a heat-sinking holder for holding a diamond and for making thermal contact with a side surface of the diamond adjacent to an edge of a growth surface of the diamond, a noncontact temperature measurement device positioned to measure temperature of the diamond across the growth surface of the diamond and a main process controller for receiving a temperature measurement from the noncontact temperature measurement device and controlling temperature of the growth surface such that all temperature gradients across the growth surface are less than 20° C. The method for producing diamond includes positioning diamond in a holder such that a thermal contact is made with a side surface of the diamond adjacent to an edge of a growth surface of the diamond, measuring temperature of the growth surface of the diamond to generate temperature measurements, controlling temperature of the growth surface based upon the temperature measurements, and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface, wherein a growth rate of the diamond is greater than 1 micrometer per hour.

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**US7225149: Method for selling jewelry with stones from a single source**

Applicant: -  
Publication: 2007-05-29  
Filed: 2004-03-16  
Status: granted

A method for selling jewelry is provided where a rough stone is selected and cut to yield a number of stones that are mounted onto a set of jewelry including at least two pieces of jewelry, one for a female and the other for a male with the female usually getting a larger portion of the rough stone.

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**EP1795888A1: Apparatus for generating data for determining a property of a gemstone**

Applicant: Overseas Diamonds Technologies N.V., Belgium  
Publication: 2007-06-13  
Filed: 2005-12-09  
Status: application

An apparatus for generating image data for use in determining a visual property of a gemstone perceptible to the human eye, such as a cut diamond, the apparatus comprising: a support structure for supporting a gemstone placed at an observation position, the support structure being capable of supporting a gemstone having an axis of symmetry such that the axis of symmetry is parallel to an axis X passing through the observation position; illumination means arranged to illuminate a gemstone so placed with a spatially varied light pattern; rotation means arranged to cause relative rotation between the light pattern and the support structure generally about the axis X; and a camera arranged to capture electronic images of light returned by the gemstone and to output said images as image data; control means arranged to control the rotation means and camera such that the camera captures an electronic image of the gemstone during said relative rotation at each of a plurality of different rotational positions of the support structure relative to the light pattern, the images being captured generally along the axis X, the illumination means comprising a reflector having a concave surface arranged to reflect light generally towards the gemstone, wherein the concave surface has at least one relatively reflective region and at least one relatively unreflective region, thereby creating said light pattern, the apparatus characterised in that: the length of a boundary between the relatively reflective and unreflective regions is greater than the minimum length.

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**EP1543181B1: Single crystal diamond**

Applicant: Element Six Limited, Isle of Man IM99 6AQ, United Kingdom  
Publication: 2007-06-27  
Filed: 2003-09-19  
Status: granted

A method of producing a plate of single crystal diamond, which includes the steps of providing a diamond substrate, growing diamond homoepitaxially on a surface of the substrate by chemical vapour deposition (CVD) and severing the homoepitaxial CVD grown diamond transverse to the surface of the substrate on which diamond growth took place to produce a plate of single crystal CVD diamond having major faces that are transverse to the surface of the substrate.

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**CA2198990C: Diamond detection**

Applicant: De Beers Consolidated Mines Limited South Africa  
Publication: 2007-06-05  
Filed: 1997-03-03  
Status: granted

The invention concerns a method of detecting the presence of diamond in a body. In method the body is irradiated with a fast neutron beam modulated between first and second, distinct energy levels which are respectively resonant and non-resonant energy levels for diamond. Corresponding first and second absorption images are obtained for the body and from these images, a third absorption image is derived in which absorption effects attributable to the presence of non-diamond material in the body are eliminated or at least reduced. The resulting image is then analysed for the presence of diamond in the body. The energy modulated fast neutron beam is produced by nuclear reaction between an energy modulated particle beam and a target. The energy modulated particle beam itself is produced by a procedure in which a particle beam is passed sequentially through first and second particle accelerators in series. Modulation is achieved by operating the second particle accelerator alternately in first and second modes to produce, from the particle beam delivered by the first particle accelerator, a particle beam which is modulated between relatively high and relatively low energy levels.

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**JP2007022888A2: Polycrystalline diamond with high hardness and method for producing the same**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2007-02-01  
Filed: 2005-07-21  
Status: application

**PROBLEM TO BE SOLVED:** To provide a low-cost, single-phased, polycrystalline diamond having a fine, homogeneous structure and sufficient strength, hardness and heat resistance to be used as a tool, e.g. a cutting tool etc., or a drill bit.

**SOLUTION:** The polycrystal substantially comprises only diamond and is produced by direct conversion sintering of a raw material composition containing a non-diamond carbonaceous substance into diamond under an ultra-high-pressure, high-temperature condition without adding any sintering aid or catalyst. The polycrystal is a polycrystalline diamond with high hardness and has a mixed composition of a fine-grained diamond crystal having a maximum grain size of  $\leq 100$  nm and an average grain size of  $\leq 50$  nm and a plate-like or granular coarse-grained diamond crystal having a particle size ranging from 50 nm to 10,000 nm.

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**JP2007000959A2: Two-face machining cast iron plate for monocrystal diamond cutting edge, two-face machining device, and two-face machining method**

Applicant: National Institute Of Advanced Industrial & Technology  
Publication: 2007-01-11  
Filed: 2005-06-22  
Status: application

Problem to be solved: To provide a two-face machining cast iron plate which can machine both of an end face and a peripheral face of a monocrystal diamond cutting edge by the single cast iron plate, and also to provide a two-face machining device and a two-face machining method.

Solution: According to the structure of the two-face machining cast iron plate for the monocrystal diamond cutting edge, the disk-shaped cast iron plate has conically inclined surfaces corresponding to an end face cutting edge angle and a peripheral face cutting edge angle of the monocrystal diamond cutting edge. The two-face machining device for the monocrystal diamond cutting edge machines the end face and the peripheral face of the diamond monocrystal cutting edge by applying minute diamond particles dissolved in olive oil or the like, to the disk-shaped cast iron plate, and by rotating the cast iron plate. The conically inclined surfaces corresponding to the end face cutting edge angle and the peripheral face cutting edge angle of the cutting edge are formed on the single cast iron plate, and the monocrystal diamond cutting edge is located at a location that is shifted in a y direction from an x-axis of the cast iron plate, so as to face the inclined surfaces.

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**JP2007030095A2: Method for manufacturing diamond tool**

Applicant: Allied Material Corp  
Publication: 2007-02-08  
Filed: 2005-07-27  
Status: application

Problem to be solved: To provide a method for easily manufacturing at a low cost, even a highly accurate diamond cutting edge for ultra-precision machining, in particular, of a diamond tool having a diamond tip formed with a cutting edge.

Solution: The cutting edge is formed by forming cutting face and second flank in diamond, and the method includes: polishing the cutting face and second flank to mirror surfaces; machining an intersecting ridge of the cutting face and the second flank and the surrounding by focused ion beam; and forming a first flank. The machining is facilitated by making the polished cutting face as a plane and making the polished second flank by combining a plurality of planes. The polishing is performed so that a PV value is 3 to 300 nm in at least the surrounding of the cutting edge of the cutting face. The polishing is performed so that a PV value of a partial plane of the second flank constituted of a plurality of planes is 3 to 500 nm.

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**US20070157667A1: Enhancing the optical characteristics of a gemstone**

Applicant: -  
Publication: 2007-07-12  
Filed: 2006-12-06  
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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**US20070157666A1: Coatings for gemstones**

Applicant: Azotic Coating Technology, Inc., United States of America  
Publication: 2007-07-12  
Filed: 2006-11-20  
Status: application

The invention provides a decorative object comprising a transparent or translucent substrate having a body and at least one surface bearing a thin film coating. The coating imparts in the substrate a body color that appears substantially constant at different angles of observation. This body color is imparted in the substrate at least in part by absorption of visible radiation that is transmitted through said coating. The coating includes a high absorption layer comprising film that is highly absorptive of visible radiation. Also provided are methods of coating gems and other decorative objects, as well as methods of heat treating coated gems and other decorative objects.

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**EP1813385A1: Method of burnishing a hard material and decorated workpiece made from a hard, burnished material**

Applicant: Comadur S.A., 2400 Le Locle, Switzerland  
Publication: 2007-08-01  
Filed: 2006-01-27  
Status: application

L'invention concerne un procédé de satinage d'une pièce en un matériau présentant une dureté Vickers supérieure à 1000 HV, comportant une surface à traiter, comprenant les principales étapes suivantes :- se munir d'un porte-pièce et d'un outil abrasif comportant un substrat et une partie active solidaire du substrat et formée de particules calibrées agglomérées à l'aide d'un liant et, - fixer la pièce au porte pièce, - donner à la pièce et à l'outil abrasif un mouvement relatif, de sorte que la surface est au contact de la partie active sur une portion au moins des trajectoires de la pièce et de l'outil abrasif, de façon à former sur la surface des sillons sensiblement parallèles entre eux, la partie active étant constituée d'agrégats formant des motifs répartis régulièrement sur le substrat, ou le liant étant de type vitrifié.

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**CN1328028C: Rectangular brilliant-cut diamond**

Applicant: -  
Publication: 2007-07-25  
Filed: 2003-10-31  
Status: granted

A diamond is provided which is subjected to an improved rectangular brilliant-cut producing a facet configuration having an optimal shape for the purpose of increasing the visual-perceptible reflection ray amount. In the rectangular brilliant-cut diamond, the bezel facets at the four crown vertexes each is bent along the diagonal line parallel to the girdle, to yield the facet configuration in which the bezel facet is divided into the lower bezel facet and the upper bezel facet. The upper crown angle of an upper bezel facet can be made smaller than the crown angle of a lower bezel facet, and hence even without altering the crown height, by making the table facet slightly smaller, the tilt angles from the horizontal of the star facets and the second bezel facets, both provided with intense reflection, can be made small and the areas thereof can be made large. Thus, the reflection patterns become all alike in size in a manner preferable for the visual perception, and making the star facets and the second bezel facets have small tilt angles from the horizontal permits making the reflection extremely intense in cooperation with enlargement of the areas of the star facets and the second bezel facets.

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**CA2352725C: Cut design of diamond for ornamental use**

Applicant: Hohoemi Brains, Inc Japan  
Publication: 2007-06-26  
Filed: 2001-07-09  
Status: granted

A cut design for diamonds having a crown of substantially a frustum shape and substantially a conic pavilion directly under the frustum part, the diamond being enhanced in the brilliancy and scintillation of its crown part, the brilliancy and scintillation twinkling, and bluish lights being returned as reflected lights. A crown angle and a pavilion angle are so determined that lights coming in crown facets and emitted from crown facets, lights coming in the table facet and emitted from the crown facets, and lights coming in the crown facets and emitted from the table facet be directed toward the observer at the same time.

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**WO07081492A2: High growth rate methods of producing high-quality diamonds**

Applicant: UAB Research Foundation, United States of America  
Publication: 2007-07-19  
Filed: 2006-12-15  
Status: application

In one aspect, the invention relates to a method of producing high-quality diamond comprising the steps of providing a mixture comprising hydrogen, a carbon precursor, and oxygen; exposing the mixture to energy at a power sufficient to establish a plasma from the mixture; containing the plasma at a pressure sufficient to maintain the plasma; and depositing carbon-containing species from the plasma to produce diamond at a growth rate of at least about 10  $\mu\text{m/hr}$ ; wherein the diamond comprises less than about 10 ppm nitrogen. The invention also relates to the apparatus, gas compositions, and plasma compositions used in connection with the methods of the invention as well as the products produced by the methods of the invention. This abstract is intended as a scanning tool for purposes of searching in the particular art and is not intended to be limiting of the present invention.

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**US20070157917A1: High pressure superabrasive particle synthesis**

Applicant: Platform Development & Investment Ltd., Israel  
Publication: 2007-07-12  
Filed: 2006-12-14  
Status: application

An improved method for controlling nucleation sites during superabrasive particle synthesis can provide high quality industrial superabrasive particles with high yield and a narrow size distribution. The synthesis method can include forming a particulate crystal growth layer by mixing a raw material and a catalyst material and then placing the crystalline seeds in a predetermined pattern in the growth layer. Preferably, seeds can be substantially surrounded by catalyst material. The growth precursor can be maintained at a temperature and pressure at which the superabrasive crystal is thermodynamically stable for a time sufficient for a desired degree of growth. The crystalline seeds can be placed in a predetermined pattern using a template, a transfer sheet, vacuum chuck or similar techniques. The superabrasive particles grown using the described methods typically have a high yield of high quality industrial particles and a narrow distribution of particle sizes.

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**US20070157875A1: Diamond uses/applications based on single-crystal CVD diamond produced at rapid growth rate**

Applicant: -  
Publication: 2007-07-12  
Filed: 2006-11-15  
Status: application

The present invention is directed to new uses and applications for colorless, single-crystal diamonds produced at a rapid growth rate. The present invention is also directed to methods for producing single crystal diamonds of varying color at a rapid growth rate and new uses and applications for such single-crystal, colored diamonds.

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**US7238088: Enhanced diamond polishing**

Applicant: Apollo Diamond, Inc  
Publication: 2007-07-03  
Filed: 2006-01-05  
Status: granted

A grown single crystal diamond is polished using a non contact polishing technique, which leaves a residue on the diamond surface. In one embodiment, a wet chemical etch is performed to remove the residue, leaving a highly polished single crystal diamond surface. In a further embodiment, a colloidal silica solution is used in combination with rotating polishing pads to remove the residue. Both residue removing techniques may be used in further embodiments.

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**US7251619: Computer implemented method, computer program product, and system for gem evaluation**

Applicant: Holloway; Garry Ian, Canterbury, Victoria, Australia  
Publication: 2007-07-31  
Filed: 2001-06-18  
Status: granted

System and method for providing a gem assessment based upon proportional parameter values relating to the proportions of a gem, such as a diamond. A gem cut quality rating is provided. The system and method are particularly suited for use in an online environment or may be utilized in conjunction with rough diamond analysis instruments in order to provide cutters with greater guidance as to the most appropriate dimensions to cut rough diamonds in order to maximize the yield of a rough diamond and to also produce a diamond of an acceptable grade.

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**US7241434: High pressure and high temperature production of diamonds**

Applicant: Bellataire International, LLC, Worthington, United States of America  
Publication: 2007-07-10  
Filed: 2001-08-08  
Status: granted

The present invention is directed to a method for treating discolored natural diamond, especially Type IIa diamond and Type IaA/B diamond with nitrogen as predominantly B centers, for improving its color. The method includes preblocking and preshaping a discolored natural diamond to prevent its breakage in a high pressure/high temperature (HP/HT) press, placing said discolored natural diamond in a pressure transmitting medium which is consolidated into a pill. Next, the pill is placed into a HP/HT press at elevated pressure and elevated temperature within the graphite-stable or diamond-stable range of the carbon phase diagram for a time sufficient to improve the color of said diamond. Finally, the diamond is recovered from said press. Colorless and fancy colored

diamonds can be made by this method.

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**US7239739: Apparatus for generating data for determining a property of a gemstone and methods and computer programs for determining a property of a gemstone**

Applicant: Overseas Diamonds Technologies, Antwerp, Belgium  
Publication: 2007-07-03  
Filed: 2004-08-19  
Status: granted

An apparatus for generating data for use in determining a property of a gemstone, such as a cut diamond with a support structure for supporting a gemstone placed at an observation position, the support structure being arranged such that, if the gemstone has an axis of symmetry, the gemstone is supportable such that the axis of symmetry is parallel to an axis X passing through the observation position; an illuminator arranged to illuminate a gemstone so placed with a spatially varied light pattern; a rotator arranged to cause relative rotation between the light pattern and the support structure generally about the axis X; and a camera arranged to capture, at each of a plurality of rotational positions, an image of light returned by the gemstone and to output said images as image data.

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**US20070163706A1: Method of bonding different kinds of gemstones**

Applicant: -  
Publication: 2007-07-19  
Filed: 2006-01-18  
Status: application

Disclosed herein is a method of bonding different kinds of gemstones to provide gems having maximum beautiful appearance. The method of this invention includes mixing a binder and a curing agent in liquid phases at a mixing ratio of 90~110:40~60 to obtain a mixture of binder and curing agent; applying the mixture of binder and curing agent onto bonding surfaces of different kinds of gemstones, and then drying/curing the applied mixture at 50~180° C. for 2~15 min to obtain a gemstone body composed of different kinds of gemstones bonded together; and cutting the gemstone body.

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**US7249471: Cut design of diamonds providing plenty of visual-perceptible reflection for ornamental use and observation method thereof**

Applicant: Hohoemi Brains, Inc. Japan  
Publication: 2007-07-31  
Filed: 2005-03-23  
Status: granted

A cut design of an ornamental diamond and an observation method of the diamond which an observer can perceive a more beauty, are disclosed. The cut design is a round brilliant

cut comprising a girdle, a crown above the girdle and a pavilion below the girdle. A girdle height (h) is 0.026 to 0.3 times a girdle radius, a pavilion angle (p) of a pavilion main facet ranges from 37.5 degrees to 41 degrees, and a crown angle (c) of a crown main facet is within a range of satisfying:  $c > -2.8667 \times p + 134.233$  and  $p < 1/4 \times \{(\sin^{-1}(1/n) + \sin^{-1}(1/n \cdot \sin c)) \times 180/\pi + 180 \cdot 2c\}$ , wherein n: refraction index of a diamond,  $\pi$ : circular constant, p: pavilion angle in degrees, and c: crown angle in degrees. The cut design of the ornamental diamond provides an observer with plenty of visual-perceptible reflection when the observer watches the diamond above a table facet with a sight line of an angle less than 20 degrees with a vertical line at the center of the table facet.

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#### **JP2007083311A2**

Applicant: Lazare Kaplan International, Inc., New York, United States of America  
Publication: 2007-04-05  
Filed: 2006-12-13  
Status: granted

Laser system for marking gemstones for subsequent authentication - has laser and cameras used to perform micro-inscribing and recording of gem details for later comparison and certification

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#### **JP2007055819A2: High-hardness polycrystalline diamond and process for producing the same**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2007-03-08  
Filed: 2005-08-22  
Status: application

Problem to be solved: To provide a polycrystalline diamond which has sufficient strength, hardness, and heat resistance and is dense and homogeneous and which can be used in working tools such as cutting tools, dressers or dies and in digging bits.  
Solution: The high-hardness polycrystalline diamond consists substantially of only diamond, and contains C13 being a carbon isotope in an amount of  $\geq 50\%$  and has hardness of  $\geq 90$  GPa. A process for producing the high-hardness polycrystalline diamond is characterized by directly converting a non-diamond type carbon substance containing C13 in an amount of  $\geq 50\%$  into diamond and at the same time, sintering at a temperature of  $\geq 2,000^\circ\text{C}$  under a pressure condition wherein diamond is thermodynamically stable without adding a sintering aid or a catalyst.

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**JP2007012073A2: Processing method for verifying, labeling and rating diamond and other gemstone from mine to market**

Applicant: Collectors Universe Inc  
Publication: 2007-01-18  
Filed: 2006-06-30  
Status: application

Problem to be solved: To provide an adjusted and reliable processing method for verifying, labeling and rating diamonds and other gemstones from mine to market to show country of origin, compliance with the Kimberley Processes and the quality rating of the diamonds or other gemstones.

Solution: This invention is a process for verifying, labeling and rating diamonds and other gemstones from mine to market to show country of origin, compliance with the Kimberley Processes and the quality rating of the diamonds or other gemstones. The process also provides for a review and verification of the outside audit and associated quarterly reviews by the outside auditor of the internal control processes of the mines, the sightholders and the cutters and polishers of the diamonds or other gemstones.

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**JP2007045667A2: Diamond in which size of dopant atom is compensated**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2007-02-22  
Filed: 2005-08-10  
Status: application

Problem to be solved: To produce a low resistance n-type or p-type diamond by contriving doping method with regard to impurity doping for producing the low resistance n-type or p-type diamond.

Solution: The p-type diamond is produced by inserting four atoms whose total valence electron number is 19 into vacancies formed by taking-out of five carbon atoms. The n-type diamond is produced by inserting four atoms whose total valence electron number is 19 into vacancies formed by taking-out of five carbon atoms.

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**JP2007067453A2: Method for etching diamond**

Applicant: Kobe Steel Ltd  
Publication: 2007-03-15  
Filed: 2006-12-11  
Status: application

Problem to be solved: To provide a method for etching a carbon-based material, which does not require heating in particular, and keeps very excellent flatness and mask selection ratio, and can obtain a shape faithful to the shape of a mask and a high etching rate.

Solution: While covering regions on a diamond except for the region to be etched with a mask made of a Si oxide, and applying to a negative electrode the high frequency

potential of  $\geq 500$  V, preferably  $\geq 1,000$  V, with reference to a counter electrode or a reaction container, etching of the diamond is performed by exposing the diamond to a plasma generated from O<sub>2</sub>, Ar or a mixed gas of O<sub>2</sub> and Ar.

**US7255743: Method of making synthetic gems comprising elements recovered from remains of a species of the kingdom animalia**

Applicant: International Research & Recovery Corporation, United States of America  
Publication: 2007-08-14  
Filed: 2003-08-19  
Status: granted

Making synthetic gem, e.g. synthetic diamond, comprises collecting pure carbon from remains of species of Kingdom Animalia, and creating gem from carbon using crystal growth sublimation

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**US20070186585A1: Oval-cut diamond**

Applicant: -  
Publication: 2007-08-16  
Filed: 2005-03-25  
Status: application

An oval-cut diamond comprises a girdle having a contour line in an oval or oval-like shape, a crown above the girdle having an octagonal table facet on a top of it and a pavilion below the girdle. The girdle is of a ratio (b/a) of a short radius to a long radius of 0.6 or more, in which a radius in long axis direction is "a", and a radius in short axis direction is "b". A pair of pavilion main facets positioned opposite to each other with respect to a central axis has a pair of crown main facets or star facets facing the pair of pavilion main facets through the girdle. The two pavilion main facets, the two crown main facets or star facets and the table facet have a common vertical plane within the facets so that brilliancy of reflection lights coming out of the table facet and crown facets is enhanced.

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**US20070186586A1: Oval-cut diamond**

Applicant: -  
Publication: 2007-08-16  
Filed: 2005-03-25  
Status: application

An oval-cut diamond comprises a girdle having a contour line in an oval or oval-like shape, a crown above the girdle having an octagonal table facet on a top of it and a pavilion below the girdle. That is a modified oval brilliant cut diamond, in which one of the crown and the pavilion is rotated by about a sixteenth revolution around its central axis from an ordinary brilliant cut diamond. The girdle is of a ratio (b/a) of a short radius

to a long radius of 0.6 or more, in which a radius in long axis direction is "a", and a radius in short axis direction is "b". A pair of pavilion main facets positioned opposite to each other with respect to the central axis has a pair of crown main facets or star facets facing the pair of pavilion main facets through the girdle. The two pavilion main facets, the two crown main facets or star facets and the table facet have a common vertical plane within the facets so that brilliancy of reflection lights coming out of the table facet and crown facets is enhanced.

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**WO07092893A2: Materials and methods for the manufacture of large crystal diamonds**

Applicant: Target Technology Company, United States of America  
Publication: 2007-08-16  
Filed: 2007-02-07  
Status: application

Materials and methods are provided for forming single crystal diamond growth using microwave plasma chemical vapor deposition (CVD) process in partial vacuum with a gaseous mixture containing a methane/ hydrogen mixture with optional nitrogen, oxygen and xenon addition. The single crystal substrate can be formed by a modified directional solidification process starting with at least one of the following: pure nickel or a nickel alloy which includes cobalt, iron, or a combination thereof using a vacuum induction melting process. A surface of the single crystal substrate is coated using an electron beam evaporation device with pure iridium or an alloy of iridium and a component selected from the group consisting of iron, cobalt, nickel, molybdenum, rhenium and a combination thereof. The alloy coated single crystal substrate is positioned in a microwave plasma CVD reactor and upon being subjected to a biased enhanced nucleation treatment in the presence of a gaseous mixture of methane, hydrogen, and other optional gases with a biased voltage of negative 100 to 400 volts supports the growth of a large single crystal diamond on its coated surface.

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**US20070198494A1: Apparatus and method for facilitating a search for sets of gems**

Applicant: -  
Publication: 2007-08-23  
Filed: 2007-03-02  
Status: application

Apparatus and method for facilitating a search for sets of gems includes, in one embodiment, a computer-readable medium having a gem search module configured to facilitate a search for a set of N matching gems (where N may be an integer of at least two). The gem search module provides a user-interface element representing a set of values of a gem attribute, receives a selection of a particular value from the set of values, and identifies a set of N matching gems as being associated with that value.

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**US20070196263A1: Colorless single-crystal CVD diamond at rapid growth rate**

Applicant: Carnegie Institution of Washington

Publication: 2007-08-23

Filed: 2006-05-23

Status: application

The present invention relates to a method for producing colorless, single-crystal diamonds at a rapid growth rate. The method for diamond production includes controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface of the diamond are less than about 20° C., and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface of a diamond at a growth temperature in a deposition chamber having an atmosphere, wherein the atmosphere comprises from about 8% to about 20% CH<sub>4</sub> per unit of H<sub>2</sub> and from about 5 to about 25% O<sub>2</sub> per unit of CH<sub>4</sub>. The method of the invention can produce diamonds larger than 10 carats. Growth rates using the method of the invention can be greater than 50 μm/hour.

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**US20070193505A1: Apparatus and method for diamond production**

Applicant: Carnegie Institution of Washington The UAB Research Foundation

Publication: 2007-08-23

Filed: 2007-04-23

Status: application

An apparatus for producing diamond in a deposition chamber including a heat-sinking holder for holding a diamond and for making thermal contact with a side surface of the diamond adjacent to an edge of a growth surface of the diamond, a noncontact temperature measurement device positioned to measure temperature of the diamond across the growth surface of the diamond and a main process controller for receiving a temperature measurement from the noncontact temperature measurement device and controlling temperature of the growth surface such that all temperature gradients across the growth surface are less than 20° C. The method for producing diamond includes positioning diamond in a holder such that a thermal contact is made with a side surface of the diamond adjacent to an edge of a growth surface of the diamond, measuring temperature of the growth surface of the diamond to generate temperature measurements, controlling temperature of the growth surface based upon the temperature measurements, and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface, wherein a growth rate of the diamond is greater than 1 micrometer per hour.

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**US20070186918A1: Device and kit for visualizing a cutting regime of a diamond, and a method for determining a cutting regime**

Applicant: None  
Publication: 2007-08-16  
Filed: 2003-11-05  
Status: application

The present invention relates to a kit for visualising a cutting regime of a rough diamond comprising: a solid, translucent substance into which three dimensional images are marked, said markings indicating: the outer surface of the original rough diamond, optionally, the internal defects of the rough diamond, said markings indicating the position and shape of said defects with respect of the rough diamond, optionally, the outer surface of one or more cut diamonds, said markings indicating the position and shape of said cut diamonds with respect of the rough diamond, and solid, physical representations of one or more diamonds indicated by the markings of item, and/or solid, physical representation of the rough diamond, corresponding to the markings of item, and/or one or more actual cut diamonds indicated by the markings of item. The present invention further relates to a computer readable medium comprising data regarding the cut stone and the original rough diamond.

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**US7262835: Fluorescence measuring device for gemstones**

Applicant: Gemological Institute of America  
Publication: 2007-08-28  
Filed: 2006-03-23  
Status: granted

A gemstone fluorescence measuring device according to the invention generally includes an ultraviolet ("UV") emission chamber, a UV radiation source, and a light meter assembly. The UV radiation source includes an upper light emitting diode ("LED") and a lower LED that radiate a gemstone under test from both above and below the gemstone. The UV radiation source provides both trans-radiation and direct radiation to the gemstone, and the UV radiation source has an adjustable intensity, thus facilitating calibration of the fluorescence measuring device. The light meter assembly includes a light detector that detects the visible light emitted from the gemstone under test in response to the UV radiation. The light detector is configured to simulate the spectral characteristics of the human eye. The fluorescence measuring device converts the measured visible light into a numerical lux reading, which can then be converted into a fluorescence grade for the gemstone under test.

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**US7260544: System and methods for evaluating the appearance of a gemstone**

Applicant: Gemological Institute of America  
Publication: 2007-08-21  
Filed: 2000-10-12  
Status: granted

Of the “four C's,” cut has historically been the most complex to understand and assess. This application presents a three-dimensional mathematical model to study the interaction of light with a fully faceted, colorless, symmetrical round-brilliant-cut diamond. With this model, one can analyze how various appearance factors (brilliance, fire, and scintillation) depend on proportions. The model generates images and a numerical measurement of the optical efficiency of the round brilliant—called DCLR—which approximates overall fire. DCLR values change with variations in cut proportions, in particular crown angle, pavilion angle, table size, star facet length, culet size, and lower girdle facet length. The invention describes many combinations of proportions with equal or higher DCLR than “Ideal” cuts, and these DCLR ratings may be balanced with other factors such as brilliance and scintillation to provide a cut grade for an existing diamond or a cut analysis for prospective cut of diamond rough.

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**US7259839: Method and apparatus for examining a diamond**

Applicant: Holloway; Garry Ian, Australia / Sivovolenko; Sergey B., Moscow  
Publication: 2007-08-21  
Filed: 2004-06-04  
Status: granted

Prior methods of measuring diamond proportions in order to construct a complete model, such as a three dimensional virtual wire-frame model, of a diamond have been found to be inadequate. In particular, there has been no commercially available, automated and objective method for measuring the dimensions of a diamond with similar or greater accuracy as compared with the accuracy that can be achieved with manual gauges or micrometers. The present invention provides a method of measuring a physical characteristic of a facet of a diamond, such as the location of one or more points on an edge of a facet. The method comprises illuminating the diamond to visually distinguish a facet from adjacent facets when viewed from a predetermined location, and then capturing an image of the diamond as viewed from this predetermined location. The image is then analyzed to determine the location of at least one point located on an edge of a facet by identifying a discontinuity in the properties of light transmitted from the diamond to the viewing location.

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**US7258741: System and method for producing synthetic diamond**

Applicant: Apollo Diamond, Inc., United States of America  
Publication: 2007-08-21  
Filed: 2003-04-08  
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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**JP2007102592A2: Sales method of diamonds**

Applicant: Crossfor  
Publication: 2007-04-19  
Filed: 2005-10-06  
Status: application

Problem to be solved: To provide a sales method of selling a pair of diamonds cut out from an ore always as a set of product.

Solution: A computer system comprises: a storage means 3 for storing a database 2 for registering data on the pair of diamonds cut out of the ore; a retrieval means 4 for selecting from the database 2 the pair of diamonds which meet a desired condition; a data display means 5 for displaying data on the selected pair of diamonds; a cut designation means 6 for designating a ratio among the respective sizes of the pair of diamonds and the desired kind of cut applied to the diamonds; an assumed cut image display means 7 for displaying an assumed image of the pair of diamonds generated on the basis of the ratio among the respective sizes and the kind of cut; and a message input means 9 for inputting a desired message to be inscribed on the pair of diamonds as the necessity arises.

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**ES2279792T3: Talla de diamante para uso ornamental.**

Applicant: Hohoemi Brains, Inc.  
Publication: 2007-09-01  
Filed: 2001-08-03  
Status: translation of granted EP

Ornamental diamond cut design with facets above and below girdle

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**US20070209390A1: Multiplet gemstones with directly printed embedded translucent images**

Applicant: -  
Publication: 2007-09-13  
Filed: 2006-03-06  
Status: application

A multiplet gemstone is described having a first and a second layer of gemstone material, the first and second layers each having an interfacial surface; and wherein one of the interfacial surfaces has a translucent image printed thereon. A method of making the multiplet gemstone is described including a first step of providing a first layer of

gemstone material having at least one flat surface; a second step of providing a second layer of gemstone material having at least one flat surface; a third step of direct printing a translucent image onto the flat surface of the first layer; and a fourth step of bonding the flat surface of the first layer to the flat surface of the second layer to manufacture the multiplet gemstone.

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**US20070222972A1: Systems and methods for evaluating and displaying the dispersion of a diamond or other gemstone**

Applicant: -  
Publication: 2007-09-27  
Filed: 2006-03-24  
Status: application

Systems and methods for evaluating and displaying a diamond's dispersion or fire potential. These systems and methods can be used to determine the dispersion of a diamond relative to an observation point, which can then be used to provide for a map or other indicator of a diamond's fire potential when it is observed from that point.

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**US20070212543A1: Coloured diamond**

Applicant: -  
Publication: 2007-09-13  
Filed: 2007-03-08  
Status: application

A diamond layer of single crystal CVD diamond which is coloured, preferably which has a fancy colour, and which has a thickness of greater than 1 mm.

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**US20070209578A1: Method for producing substrate for single crystal diamond growth**

Applicant: Shin-Etsu Chemical Co., Ltd., Japan  
Publication: 2007-09-13  
Filed: 2007-03-02  
Status: application

There is disclosed a method for producing a substrate for single crystal diamond growth, comprising at least a step of preliminarily subjecting a substrate before single crystal diamond growth to a bias treatment for forming a diamond nucleus thereon by a direct-current discharge in which an electrode in a substrate side is a cathode, and wherein in the treatment, at least, a temperature of the substrate from 40 sec after an initiation of the bias treatment to an end of the bias treatment is held in a range of 800° C.±60° C. There can be provided a method for producing a substrate for single crystal diamond growth, by which a single crystal diamond can be grown more certainly.

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**US7270707: Method for the preparation of diamond, graphite or their mixture**

Applicant: University of Science and Technology of China  
Publication: 2007-09-18  
Filed: 2002-11-15  
Status: granted

The present invention provides a method of preparation for diamond, graphite or mixtures of diamond and graphite by reduction of CO or CO<sub>2</sub>. Said method comprises a step of contacting an active metal capable of reducing a carbon source into elementary carbon with carbon source (such as CO and/or CO<sub>2</sub> and/or their origin) under conditions suitable to reduce the carbon source to elementary carbon in the course of a reduction reaction. After the raw diamond or mixtures of diamond and graphite thus obtained are subjected to intensive heat treatment with perchloric acid, pure diamond granules are obtained. The present method employs relatively low reaction temperature and pressure and the facilities needed in the method are simple and easy to operate. Diamond finally obtained has good crystallinity and free of impurities with granule size of several hundred micrometer. In addition, the present invention makes use of the industrial by-product of CO and CO<sub>2</sub> which not only turns wastes into valuables and is low in cost, but also improves the environment and thus possesses both good social benefits and economical benefits.

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**US7265316: Laser marking system**

Applicant: Lazare Kaplan International, Inc., United States of America  
Publication: 2007-09-04  
Filed: 2004-01-26  
Status: granted

A laser energy microinscribing system, comprising a semiconductor excited Q-switched solid state laser energy source; a cut gemstone mounting system, allowing optical access to a mounted workpiece; an optical system for focusing laser energy from the laser energy source onto a cut gemstone; a displaceable stage for moving said gemstone mounting system with respect to said optical system so that said focused laser energy is presented to desired positions on said gemstone, having a control input; an imaging system for viewing the gemstone from a plurality of vantage points; and a rigid frame supporting said laser, said optical system and said stage in fixed relation, to resist differential movements of said laser, said optical system and said stage and increase immunity to vibrational misalignments. The laser energy source is preferably a semiconductor diode excited Q-switched Nd:YLF laser with a harmonic converter having an output of about 530 nm. The system may further comprise an input for receiving marking instructions; a processor for controlling said displaceable stage based on said marking instructions and said imaging system, to selectively generate a marking based on said instructions and a predetermined program; and a storage system for electronically storing information relating to images of a plurality of workpieces. A secure certificate of

authenticity of a marked workpiece is also provided.

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**EP1832673A1: Method for producing substrate for single crystal diamond growth**

Applicant: Shinetsu Chemical Co., Ltd., Tokyo  
Publication: 2007-09-12  
Filed: 2007-03-07  
Status: application

There is disclosed a method for producing a substrate for single crystal diamond growth, comprising at least a step of preliminarily subjecting a substrate before single crystal diamond growth to a bias treatment for forming a diamond nucleus thereon by a direct-current discharge in which an electrode in a substrate side is a cathode, and wherein in the treatment, at least, a temperature of the substrate from 40 sec after an initiation of the bias treatment to an end of the bias treatment is held in a range of  $800^{\circ}\text{C} \pm 60^{\circ}\text{C}$ . There can be provided a method for producing a substrate for single crystal diamond growth, by which a single crystal diamond can be grown more certainly.

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**EP1832672A1: Single-crystal diamond**

Applicant: Sumitomo Electric Industries, Ltd., Japan  
Publication: 2007-09-12  
Filed: 2005-05-26  
Status: publication

A single crystal diamond grown by vapor phase synthesis, wherein when one main surface is irradiated with a linearly polarized light considered to be the synthesis of two mutually perpendicular linearly polarized light beams, the phase difference between the two mutually perpendicular linearly polarized light beams exiting another main surface on the opposite side is, at a maximum, not more than 50 nm per 100  $\mu\text{m}$  of crystal thickness over the entire crystal. This single crystal diamond is of a large size and high quality unattainable up to now, and has characteristics that are extremely desirable in semiconductor device substrates and are applied to optical components of which low strain is required.

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**EP1228359B1: Method of determining whether a natural diamond has been processed at high pressure and high temperature**

Applicant: Bellataire International, United States of America  
Publication: 2007-09-12  
Filed: 2000-10-02  
Status: granted

A method of detecting whether a natural diamond has been processed at high pressure and high temperature (HPHT) conditions, the method comprising: disposing a diamond in a cryostat that is provided at temperatures equal to or less than liquid nitrogen ( $-196^{\circ}\text{C}$  or

below); illuminating the diamond with a laser beam; recording an optical spectrum of the diamond with a photoluminescence spectrometer; examining the optical spectrum for the presence of at least one spectral line, wherein said at least one spectral line is a 2.53 eV (491 nm) spectral line, and if the 2.53 eV (491 nm) spectral line is present, the method comprises determining that the diamond was not processed under HPHT conditions.

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**US20070216907A1: Jewelry inner structure detecting method and apparatus thereof**

Applicant: -  
Publication: 2007-09-20  
Filed: 2007-01-03  
Status: application

A method for the jewelry inner structure detection comprising steps of dividing the light emitted from a low coherence light source into two beams by means of a light splitter, one beams is then directed to a sample arm on which a gem to be detected is fixed and the other beam is directed to a reference arm capable of cause optical path length change and reflect light; adjusting the optical path length; transforming the light interference signal into a corresponding electrical signal; and transferring the electrical signal to a signal processor and analyzer; changing the optical path of the reference arm, obtaining one dimensional light intensity signal in the gem depth direction and then lateral scanning the gem to be detected to obtain a two dimensional optical slice image of the gem.

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**US7264675: Diamond manufacturing method**

Applicant: -  
Publication: 2007-09-04  
Filed: 2005-06-10  
Status: granted

In a diamond manufacturing method, a melt of carbon and blue kimberlite is contained in a vessel at 1000° C. The vessel is pressurized by a gas of predominantly hydrogen to 200 atmospheres. A crystallization seed is drawn from the melt to generate a piece of diamond material.

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**WO07106438A2: Methods of manufacturing highly polished gemstones**

Applicant: Versilant Nanotechnologies, United States of America  
Publication: 2007-09-20  
Filed: 2007-03-12  
Status: application

The invention encompasses the creation of upgraded gemological mineral particles and methods of manufacture and application of such gemological mineral particles. In particular, the invention encompasses a process for grinding gemological minerals into particles and polishing those particles to generate novel high quality gemstones. The



application for the polished gem stone particles will be used to make jewelry.

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**JP2007083311A2: Laser energy microinscribing system and method**

Applicant: Lazare Kaplan International Inc  
Publication: 2007-04-05  
Filed: 2006-12-13  
Status: application

Problem to be solved: To provide a system employing a Q-switched pulse laser for forming markings on a portion of a gemstone with high positioning precision.  
Solution: The laser energy microinscribing system for a workpiece comprises: a laser energy source; a workpiece mounting system, allowing optical access to a mounted workpiece; an optical system for focusing laser energy from the laser energy source onto the workpiece; a relative positioning system for direction said focused laser energy onto a desired portion of the workpiece, having a control input; and an electronic imaging system for automatically deciding the relation between the focal face of the optical system and the surface of the workpiece, viewing the workpiece from a plurality of vantage points. Said workpiece mounting system and said optical system lie in relation fixed by a rigid frame, to resist misalignments caused by external vibration during the operation.

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**JP2007521113T2**

Applicant: -  
Publication: 2007-08-02  
Filed: 2004-12-10  
Status: application

Incorporation of mark of origin in chemical vapor deposited diamond material for use as e.g. gemstone comprises introducing selected chemical dopants in controlled manner into synthesis process.

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**JP2007112637A2: Method for processing diamond**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2007-05-10  
Filed: 2005-10-18  
Status: application

Problem to be solved: To provide a method capable of easily separating even diamond having a large surface area into a thin plate without causing surface damage or internal crack, particularly useful for the slicing of a large single-crystal diamond substrate.  
Solution: This method for processing diamond is characterized by: laminating, on a first diamond layer having a low light transmittance, a second diamond layer having higher transmittance than that of the first diamond layer; transforming the first diamond by

irradiating the upper or lower surface of the resulting diamond laminate with laser beam ; and dissociating the transformed diamond layer by heat-treating, electrochemically etching, acid etching or the like to separate the second diamond layer from the substrate or from each other.

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**GB2436278A: Method to control light in diamonds, gem stones and other transparent faceted objects**

Applicant: Sherriff David Roger, United Kingdom  
Publication: 2007-09-26  
Filed: 2006-03-21  
Status: application

A cut-stone, e.g. a diamond or a gem stone, is divided into two separate parts where one side of the divide is primarily for refracting the light entering and leaving the cut-stone, referred to as the viewing-side part, and the other side of the divide is primarily for reflecting the light with-in the cut-stone, referred to as the reflecting-side part. The two parts are separated by a static or moveable material insert part of any material form and of any function. By dividing the cut-stone into parts, the parts can each have different materials and functions. The movement of the material insert can be rotational, linear or a combination. There may be more than one material insert, and the cut-stone can be divided at any angle. The reflecting-side and/or the viewing-side may be hollow and mirrors may be provided to imitate.

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**WO07123600A1: Multiplet gemstones with directly printed embedded translucent images**

Applicant: Signity Americas Ltd. United States of America  
Publication: 2007-11-01  
Filed: 2007-03-06  
Status: application

A multiplet gemstone is described having a first and a second layer of gemstone material, the first and second layers each having an interfacial surface; and wherein one of the interfacial surfaces has a translucent image printed thereon. A method of making the multiplet gemstone is described including a first step of providing a first layer of gemstone material having at least one flat surface; a second step of providing a second layer of gemstone material having at least one flat surface; a third step of direct printing a translucent image onto the flat surface of the first layer; and a fourth step of bonding the flat surface of the first layer to the flat surface of the second layer to manufacture the multiplet gemstone.

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**US20070234758A1: Creating illusion of large gemstones**

Applicant: -  
Publication: 2007-10-11  
Filed: 2006-03-30  
Status: application

Creating the illusion of a larger diamond from smaller diamonds. In an embodiment, four corner diamonds (of circular shape and equal size) are placed in four corners of a square area and a center diamond is placed in the gap presented by the four corner diamonds. The center diamond is placed at a level below that of the four corner diamonds and is supported by a rim such that the center diamond does not have to rely on the corner diamonds for support. The rim supports the center diamond at about 90-95% of its pavilion height in one embodiment. Prongs are used in addition to support the corner diamonds.

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**US7284396: Method and system for laser marking in the volume of gemstones such as diamonds**

Applicant: International Gemstone Registry Inc., Kelowna, Canada  
Publication: 2007-10-23  
Filed: 2005-08-22  
Status: granted

A method and an apparatus for laser marking indicia in the volume of gemstones such as diamonds, the indicia being made up of a plurality of microscopic dot-shaped marks whose build-up can be initiated by exposing naturally-occurring internal defects or impurities in the volume of a gemstone to a tightly focused train of laser pulses. Authentication data is encoded in the gemstone from the relative spatial arrangement of the dot-shaped marks that form the indicium. Taking advantage of the presence of otherwise invisible defects in the gemstone allows for inscribing indicia with laser pulses carrying energies substantially lower than the threshold energy required for inscribing in the volume of a perfect gemstone material. The marking process is then much less susceptible to inflict damages to the surface of the gemstone, and the marking can be performed using a broad variety of femtosecond laser systems. The dot-shaped marks engraved at a depth below the surface of a gemstone can be made undetectable with the unaided eye or with a loupe by limiting their individual size to a few micrometres, while devising indicia made up of only a few marks. As a result, the marking does not detract from the appearance and value of the gemstone. The procedure for laser marking accounts for the random spatial distribution of the defects present in natural gemstones as well as for their strongly localized character. The presence of an indicium can be detected by using a dedicated optical reader that can be afforded by every jewellery store.

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**WO07111967A2: Chemically attached diamondoids for cvd diamond film nucleation**

Applicant: Chevron U.S.A. Inc. United States of America  
Publication: 2007-10-04  
Filed: 2007-03-23  
Status: application

Provided is a novel method for nucleating the growth of a diamond film. The method comprises providing a substrate having a diamondoid chemically attached to it, which serves as a superior nucleation site, and then facilitating the growth of the diamond film.

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**WO07111747A2: Systems and methods for evaluating and displaying the fire of a diamond or other gemstone**

Applicant: American Gem Society, United States of America  
Publication: 2007-10-04  
Filed: 2006-12-20  
Status: application

Systems and methods for evaluating and displaying a diamond's dispersion or fire potential. These systems and methods can be used to determine the dispersion of a diamond relative to an observation point, which can then be used to provide for a map or other indicator of a diamond's fire potential when it is observed from that point.

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**US20070254155A1: Enhanced diamond polishing**

Applicant: -  
Publication: 2007-11-01  
Filed: 2007-07-02  
Status: application

A grown single crystal diamond is polished using a non contact polishing technique, which leaves a residue on the diamond surface. In one embodiment, a wet chemical etch is performed to remove the residue, leaving a highly polished single crystal diamond surface. In a further embodiment, a colloidal silicon solution is used in combination with rotating polishing pads to remove the residue. Both residue removing techniques may be used in further embodiments.

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**US7288738: Laser bruting machine**

Applicant: Patel; Arvindbhai, Gujarat, India  
Publication: 2007-10-30  
Filed: 2003-07-18  
Status: granted

A laser bruting machine has three sections: a diamond holder, a set up device and a processing device. The diamond holder includes a rough diamond, a stitching die and a magnetic die. The rough diamond stone to be centered and bruted is stitched on top of the stitching die by adhesive and heat. The stitching die is then fixed on top of the magnetic die. The setup device includes a computer numerical control (CNC) interface and video system. The diamond to be centered, and hence the diamond holder, is put vertically on motorized rotatable platform. After completion of centering the diamond, the diamond holder is carried to a processing device and fixed horizontally on a motorized rotatable platform of the processing device. The processing device includes a CNC interface, a heat exchanger, a video system, a beam delivery mechanism, a laser source, an RF-Q switch driver, a power supply and a stabilizer. The beam delivery mechanism of the processing device includes a bruting process system and a girdle polishing system. With standard software, the computer suggests an optimal cut to provide an accurate rounded shape of the diamond by taking the dimensions the shape of the diamond into account.

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**US7277161: Method for discerning colorless and near colorless diamonds and arrangement for carrying out this method**

Applicant: WTOCD, Lier, Belgium  
Publication: 2007-10-02  
Filed: 2005-03-09  
Status: granted

The invention concerns a method for qualifying a diamond on the basis of a measured light transmission through the diamond, whereby the diamond is radiated by a light source which emits light having a wavelength in a range of 225 nm to 300 nm, whereby the transmission of said light through the diamond is compared to a reference value which corresponds to the transmission of said light through a reference diamond, which is a cut colourless or near colourless diamond with a concentration of A centers between 7 ppm and 22 ppm, and whereby the diamond is classified as natural and not colour-treated if the transmission through the diamond is smaller than or equal to the reference value.

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**US20070219960A1: Computerized search technique, such as an internet-based gemstone search technique**

Applicant: Blue Nile, Inc.  
Publication: 2007-09-20  
Filed: 2006-08-24  
Status: application

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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**WO07110683A2: Method and means for the creation of virtual whole diamond and other precious stone cut shapes utilizing a plurality of stones**

Applicant: -  
Publication: 2007-10-04  
Filed: 2006-07-12  
Status: application

The uniqueness of this invention is the duplication of an actual full cut diamond or other precious stones by assembling a plurality of stones cut with a 12-15 degree angle drops from the center stone. The purpose of this invention was and is; to create the look and replication of a round brilliant or other various shape diamonds and other precious stones, in which the total carat weight used in the creation of the Virtual Diamond or other precious stones, is considerably less than what is now required to get the same shape and look of current methods utilized in cutting diamonds into their final shape for setting into a piece of jewelry. The embodiment of this invention is of a three fold nature; one, is the ability to utilize a plurality of smaller cut stones which for the same quality and clarity of larger stones, are far less expensive and therefore have a very significant commercial mass market appeal; Two, the actual look or size of the diamond or other precious stone creation will be several times the actual size of the carat weight, thus providing the jewelry consumer with the look and quality of a stone costing many times more than normal, thus enabling consumers with modest financial means to acquire the look and high quality that before hand could only be acquired by a consumer with substantial financial means. These Virtual Stone Creations with their included setting can then be mixed and matched to create a large verity of jewelry creations such as rings, earrings, necklaces, bracelets, pins, broaches, anklets, etc.; Three, another embodiment of this invention is the method and means to mass produce the invention at competitive prices, thus making it economically practical, this being the primary reason why prior art patents issued many years ago never became commercially practical.

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**JP2007160039A2: Ornamental article**

Applicant: Mitobe Yuko  
Publication: 2007-06-28  
Filed: 2005-12-14  
Status: application

Problem to be solved: To provide an ornamental article designed for the expectation of a healing effect.

Solution: This ornamental article is the new ornamental article obtained by combining the philosophy of a power stone with the philosophy of aura-soma, and is designed in coloration based upon the philosophy of aura-soma by using two natural stones or processed stones.

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**JP2007147486A2: Method of sorting diamond for tool**

Applicant: Allied Material Corp, Higuchi Masahiro, Shimada Shoichi  
Publication: 2007-06-14  
Filed: 2005-11-29  
Status: application

Problem to be solved: To provide a method for easily sorting diamonds that are suitable for use in diamond tools, in a non-destructive manner by utilizing the infrared absorption of the diamonds.

Solution: Diamonds that are to be sorted are irradiated with infrared rays, and the absorbance of the infrared absorption band (wave number: 1,350-1,380 cm<sup>-1</sup>, wave number: 1,282 cm<sup>-1</sup> and wave number: 1,175 cm<sup>-1</sup>) of nitrogen impurities and the absorbance of the infrared absorption band (wave number: 2,200 cm<sup>-1</sup>) of a diamond crystal are measured by an FT-IR analysis method. Diamonds having a ratio of the absorbance of nitrogen impurities to the absorbance of a diamond crystal structure larger than 1 is sorted as diamonds being high in chipping resistance and diamonds which have the ratio for the absorbance is to be smaller than 1 sorted as diamonds that have large abrasion resistance.

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**JP2007138281A2: Method for synthesizing diamond and diamond synthesizer**

Applicant: Sumitomo Electric Ind Ltd  
Publication: 2007-06-07  
Filed: 2006-03-22  
Status: application

Problem to be solved: To realize the gas phase synthesis of diamond at a high film deposition rate with a film thickness distribution and a resistivity distribution reduced.

Solution: In the gas phase synthesis of diamond by a heat filament CVD (chemical vapor deposition) process, a plurality of gas introduction ports are provided, hydrogen and oxygen are introduced from the other gas introduction port far from a sample and a filament, and a carbon-containing gas such as methane is introduced from the first gas introduction ports near the sample or the like. Thus, conditions high in the abundance ratio of active species containing carbon and atomic hydrogen contributing to the growth of diamond can be formed in the vicinity of the sample.

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**US20070261440A1: Liberty cut gemstone**

Applicant: -  
Publication: 2007-11-15  
Filed: 2006-05-09  
Status: application

A cut gemstone comprising a girdle, a crown above the girdle and a pavilion below the girdle, the crown comprising a table and the pavilion comprising a culet and a plurality of

pavilion faces between the girdle and the culet, the pavilion faces comprising a plurality of constituent faces and a plurality of star faces, the star faces and constituent faces alternating in circumferential direction of the pavilion, each of the constituent faces having a first and a second cutting edge, each star face being delimited from adjacent first and second constituent faces by respectively the first and second cutting edge of the first and second constituent faces respectively, each first cutting edge of a constituent face intersecting with a second cutting edge of a consecutive constituent face thus defining first and second star points respectively, the first and second cutting edges of consecutive constituent faces diverging towards the culet causing the first and second cutting edges of one single constituent face to intersect in a top of the constituent face, the star faces thus defining a visible star-shaped figure between them, the star-shaped figure comprising the culet. The cut gemstone according to the invention has an enhanced brilliance, contrast, fire and scintillation by adding specific facets in the pavilion.

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**US7290404: Gemstone material**

Applicant: Azotic Coating Technology, United States of America  
Publication: 2007-11-06  
Filed: 2003-07-14  
Status: granted

The invention provides a gemstone material having therein embedded a plurality of dichroic particles. Methods of producing the gemstone material are also provided. The gemstone material can be provided in the form of a slab, faceted gemstone, or cabochon.

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**DE60127210T2: Diamantschliff für Schmuckzwecke**

Applicant: Hohoemi Brains Inc., Japan  
Publication: 2007-11-22  
Filed: 2001-08-03  
Status: application

Ornamental diamond cut design with facets above and below girdle

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**EP1855556A1: Method and system for laser marking in the volume of gemstones such as diamonds**

Applicant: International Gemstone Registry Inc., Canada  
Publication: 2007-11-21  
Filed: 2005-08-26  
Status: application

A method and an apparatus for laser marking indicia in the volume of gemstones such as diamonds, the indicia being made up of a plurality of microscopic dot-shaped marks whose build-up can be initiated by exposing naturally-occurring internal defects or impurities in the volume of a gemstone to a tightly focused train of laser pulses.



Authentication data is encoded in the gemstone from the relative spatial arrangement of the dot-shaped marks that form the indicium. Taking advantage of the presence of otherwise invisible defects in the gemstone allows for inscribing indicia with laser pulses carrying energies substantially lower than the threshold energy required for inscribing in the volume of a perfect gemstone material. The marking process is then much less susceptible to inflict damages to the surface of the gemstone, and the marking can be performed using a broad variety of femtosecond laser systems. The dot-shaped marks engraved at a depth below the surface of a gemstone can be made undetectable with the unaided eye or with a loupe by limiting their individual size to a few micrometres, while devising indicia made up of only a few marks. As a result, the marking does not detract from the appearance and value of the gemstone. The procedure for laser marking accounts for the random spatial distribution of the defects present in natural gemstones as well as for their strongly localized character. The presence of an indicium can be detected by using a dedicated optical reader that can be afforded by every jewellery store.

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**US20070266732A1: Encrusted diamond**

Applicant: -  
Publication: 2007-11-22  
Filed: 2006-10-25  
Status: application

An encrusted gemstone comprising a base diamond having a crown with a table surface, a pavilion, and a recessed seat in the table surface, an insert diamond having a pavilion matching said recessed seat and set therein, a bore extending axially between a culet of the base diamond and the recessed seat thereof, and a shaft received within said bore, said shaft having a proximal end projecting into the recessed seat and formed with an insert retaining portion, and a distal end projecting from the culet and provided with a securing arrangement.

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**EP1852896A1: Diamond substrate and method for fabricating the same**

Applicant: Kinik Company, Taiwan  
Publication: 2007-11-07  
Filed: 2006-05-05  
Status: application

A diamond substrate and a method for fabricating the same are provided, wherein a protection layer is formed on one surface of a diamond layer in the process of forming the diamond layer by chemical vapor deposition process, for reducing the deformation of the diamond layer. Thereby the deformation of diamond substrate falls within the range of permitted tolerance of deformation, so that the performance of the diamond substrate is enhanced.

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**EP1862433A1: Personalised synthetic diamond of different colours, obtained from (living or dead) human or animal keratin and production method thereof**

Applicant: Instituto De Monocristales, Spain  
Publication: 2007-12-05  
Filed: 2005-08-16  
Status: application

The present invention refers to the provision of a process to manufacture large diamond monocrystals of different colors from carbon obtained from the keratin contained in the ectoderm of many living beings being possible to extract carbon from a human being by cutting a lock of hair and carbonizing it, and then subjecting it to a high pressure high temperature process.

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**EP1630770B1: Method and apparatus for viewing the visual properties of a gemstone on a packaging unit**

Applicant: Overseas Diamonds Technologies N.V., Belgium  
Publication: 2007-11-21  
Filed: 2004-08-26  
Status: granted

A method of displaying a visual representation of a product on a packaging unit arranged to contain the product, the packaging unit comprising a display device, a memory device and a memory port arranged to hold the memory device, the method comprising the steps of: storing information related to the product in the memory device; fitting the memory device into the memory port; and arranging the display device to display the stored information.

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**WO07132644A1: Method of selectively forming atomically flat plane on diamond surface, diamond substrate produced by the method, and semiconductor element employing the same**

Applicant: National Institute Of Advanced Industrial Science And Technology, Japan  
Publication: 2007-11-22  
Filed: 2007-04-23  
Status: application

To provide a method by which a plane which is flat on an atomic level is selectively formed on the (001), (110), or (111) surface of diamond. The method of selectively forming an atomically flat plane on a diamond surface comprises growing diamond on a diamond surface of any of crystal structures (001), (110), and (111) each having a difference in surface level by CVD (chemical vapor deposition) under such growth conditions that the step-flow growth of diamond is conducted thereafter.

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**WO07129610A1: Method for diamond surface treatment, and device using thin film of diamond**

Applicant: National Institute Of Advanced Industrial Science And Technology, Japan  
Publication: 2007-11-15  
Filed: 2007-04-27  
Status: application

To provide a method for surface treatment of diamond and a device using the thin film of diamond. 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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**JP2007252684A2**

Applicant: -  
Publication: 2007-10-04  
Filed: 2006-03-24  
Status: application

Cut structure for jewelry e.g. artificial diamond, has small cuts which are formed at curette sides along common edges of five basic cut surfaces to form star-shaped outline containing small cut surfaces

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**JP03962695B2**

Applicant: -  
Publication: 2007-08-22  
Filed: 2003-02-13  
Status: granted

Cutting method of diamond, involves forming ten pavilion main facets on pavilion side of diamond, about acute angled curette, and twenty lower girdle facets between main facets

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