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Patent News nr. 104 (01-2013)

WO2012164410A1: Method for determining a cut for a gemstone
Applicant: Octonus Dia-Tech Private, India
Publication: 2012-12-06
Filed: 2012-03-20
Status: application

Method for determining a cut for a gemstone, comprising selecting a generic shape for the cut; selecting a plurality of cut designs of a group of cut designs having the selected generic shape; simulating a number of optical metrics for the plurality of cut designs using simulation models having modeling coefficients; selecting one or more cut designs of the plurality of cut designs based on the simulated optical metrics; varying the geometry parameters for each selected cut design within a range, simulating a number of optical metrics for said range of geometry parameters, and determining an optimized cut design having optimized geometry parameters based on the simulated number of optical metrics for said range; cutting and polishing of the gemstone using the optimized cut design having the optimized geometry parameters; analyzing the visual appearance of the polished gemstone; changing or adapting the simulation models and/or the modeling coefficients thereof and/or the range for varying the geometry parameters and/or a cut design of the plurality of cut designs, and/or adding one or more new cut designs to the group of cut designs, on the basis of the analysis of the visual appearance.

WO2012156336A1: Gemstone
Applicant: Zipangu Swiss Gems AG, Switzerland
Publication: 2012-11-22
Filed: 2012-05-14
Status: application

A gemstone comprises a substantially round girdle, a crown and a pavilion. The pavilion has 40 facets.

US20120297826A1: Gemstone cut with improved characteristics
Applicant: -
Publication: 2012-11-29
Filed: 2012-03-29
Status: application

A gemstone cut is provided with a strategic placement of facets that optimizes the three dimensional optically geometric light interactions to thereby produce unique characteristics. In one embodiment, the gemstone has a crown with 29 facets, a pavilion with 28 facets and a girdle with 32 facets. The crown has a table with an octagonal shape, four first star facets, four second star facets, eight kite facets, eight first upper girdle facets and four second upper girdle facets. The pavilion can have eight pavilion facets, eight intermediate pavilion facets, eight first lower girdle facets and four second lower girdle facets. The girdle can have 32 facets including four sides each having seven facets and four facets at the corners of the gemstone interspaced between the side facets. The gemstone has four-fold mirror-image symmetry.

US20120291487A1: Gemstone of natural diamond and method applied thereto
Applicant: Diamond Trading Naamloze vennootschap, Belgium
Publication: 2012-11-22
Filed: 2012-01-24
Status: application

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

EP2279066A4: Methods for processing ornamental diamonds and corresponding ornamental diamonds
Applicant: Broukman Diamonds, Israel
Publication: 2012-12-05
Filed: 2009-04-07
Status: application

Natural diamonds processing method for forming ornamental diamonds, involves selecting diamond having visible cloud inclusion, and cutting and polishing diamond to form table and major base facet that is parallel to table

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WO2012172573A2: System and method for segregating diamonds
Applicant: Titan Industries, India
Publication: 2012-12-20
Filed: 2012-06-15
Status: application

A system for segregating diamonds includes a feeder assembly, a camera, a lighting system and a rotary and binning mechanism. The feeder assembly has a vibratory bowl. The vibratory bowl is connected to a vibrator mechanism. The vibrator mechanism is

adapted to vibrate the bowl. The vibratory bowl is essentially a container adapted to receive diamonds therein. The feeder assembly has a linear feeder which connects the vibratory bowl and the rotary and binning mechanism. A camera and a lighting system are provided near the second end of the linear feeder. A process for segregating the diamonds by using the system include obtaining the user requirement and electronically storing the user requirement in a guide card which is fed into a computer connected to system for segregation.

WO2012172571A1: Automation system for diamond bagging
Applicant: Titan Industries, India
Publication: 2012-12-20
Filed: 2012-06-15
Status: application

A system for counting diamonds includes a rotary table configured to accommodate diamonds, a collection box assembly provided in communication with the rotary table, an ejecting mechanism configured to enable controlled ejection of said diamonds from the rotary table to the collection box assembly, at least one scanner and a controller configured to regulate functioning of at least one of the rotary table, the collection box assembly, the ejecting mechanism and the scanner. Further, the scanner is configured to determine the number of diamonds collected in the collection box assembly.

WO2012158532A1: Improved microwave plasma reactors
Applicant: Board of Trustees Michigan State University, United States of America
Publication: 2012-11-22
Filed: 2012-05-11
Status: application

Microwave plasma assisted reactors, for example chemical vapor deposition (MPCVD) reactors, are disclosed. The disclosed reactors operate at high pressures (>180-320 Torr) and high power densities (> 150W/cm3), and thereby enable high deposition rate CVD processes that rapidly deposit materials. In particular, reactor design examples are described that, when operating in the 180-320 Torr pressure regime, rapidly CVD synthesize high quality polycrystalline (PCD) and single crystal diamond (SCD). The improved reactors include a radial contraction in the vicinity of the plasma chamber (and optionally a combined expansion in the vicinity of the electromagnetic wave source, followed by the contraction) in the main microwave chamber as electromagnetic energy propagates from an electromagnetic wave source to a plasma/deposition chamber.

US20120330813A1: Global investment grade for natural and synthetic gems used in financial investments and commercial trading and method of creating standardized baskets of gems to be used in financial and commercial products
Applicant: GemShares LLC, United States of America

Publication: 2012-12-27
Filed: 2012-06-28
Status: application

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

US20120312227A1: Multi-heater system for growing high quality diamond and a method for growing the same
Applicant: Gemesis Diamond Company, United States of America
Publication: 2012-12-13
Filed: 2011-06-10
Status: application

Disclosed herein is an apparatus and method for growing a diamond. The apparatus for growing a diamond comprises: a reaction cell that is configured to grow the diamond therein; a main heater including a main heating surface that is arranged along a first inner surface of the reaction cell; and a sub-heater including a sub-heating surface that is arranged along a second inner surface of the reaction cell, the second inner surface being non-parallel with the first inner surface.

US8334027: Method for DC plasma assisted chemical vapor deposition in the absence of a positive column
Applicant: Korea Institute of Science and Technology, Republic of Korea
Publication: 2012-12-18
Filed: 2007-08-03
Status: granted

In the method for depositing a material in the absence of a positive column, a discharge is generated between a cathode and an anode disposed to face each other in a reaction chamber by applying a DC voltage there between, and introducing reaction gas into the reaction chamber, thereby depositing a material on a substrate mounted on the anode and serving as a part of the anode, wherein the deposition of the material on the substrate is performed under a state that a cathode glow and an anode glow exist in a form of thin layers coating respectively the surfaces of the cathode and the substrate, while a positive

column does not exist or is so small as to be negligible.

US8319145: System and method for gemstone micro-inscription
Applicant: Lazare Kaplan International, United States of America
Publication: 2012-11-27
Filed: 2007-07-09
Status: granted

A gemstone micro-inscription system, comprising an energy source, a spatial light modulator, and a control, the control controlling a spatial light pattern modulation of the spatial light modulator, wherein the spatial light modulator exposes a photoresist on the gemstone, which selectively impedes an etching process to produce a pattern on the gemstone corresponding to the spatial light modulation pattern.

US8342164: Gemstone production from CVD diamond plate
Applicant: SCIO Diamond Technology Corporation, United States of America
Publication: 2013-01-01
Filed: 2009-05-08
Status: granted

A method of producing gemstones includes obtaining a plate of chemical vapor deposition formed diamond. The plate is cut into a plurality of geometrically optimized preforms. The preforms may be finished and cut into diamond gemstones.

WO2012177487A1: Methods, devices and computer program products for measuring light in cut gemstones based on stone-specific attributes
Applicant: Adamas Vector, United States of America
Publication: 2012-12-27
Filed: 2012-06-14
Status: application

Methods include receiving values corresponding to physical proper- ties of a cut gemstone, computing a light ray path corresponding to a projected ray that is directed from a projection point to a target point of the cut gemstone, and generating a light intensity value corresponding to an exit ray that exits from the cut gemstone.

US20120317043A1: Method and system for facilitating verification of ownership status of a jewelry-related item
Applicant: -
Publication: 2012-12-13
Filed: 2012-08-20
Status: application

A method and system for facilitating verification of ownership of a first jewelry-related item are disclosed. In at least some embodiments, the method includes receiving at a central terminal, from a mobile device via an internet-type communications medium, a certificate number associated with a first certificate corresponding to the first jewelry-related item, where the central terminal is at least one of operated and controlled by an entity that provides guarantees or warranties in relation to a plurality of certificates that respectively pertain to respective jewelry items, the plurality of certificates including the first certificate. The method additionally includes searching a database associated with the central terminal for ownership data pertaining to the first jewelry-related item, and sending the ownership data from the central terminal for receipt by the mobile device.

JP2012162456A2: Method for improving crystal integrity of diamond crystal

Applicant: Element Six Technologies
Publication: 2012-08-30
Filed: 2012-05-28
Status: application

Problem to be solved: To provide a method for producing a single crystal diamond in which the concentration of nitrogen and extended defect density are low.
Solution: There is provided the method for improving the crystal integrity of a diamond containing nitrogen in low concentration. In detail, the method includes a step of heat-treating the diamond grown at a high temperature and high pressure, representatively at a temperature of 2,100-2,500°C and pressure of 6-8 GPa.

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Patent News nr. 105 (02-2013)

US20130019636A1: Modified princess cut diamond having hearts and arrows pattern and method

Applicant: Worldwide Diamond Trademarks
Publication: 2013-01-24
Filed: 2011-08-08
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 and a girdle 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 sides 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 0.30.

US8353181: Heart shaped diamond cut having hearts and arrows pattern

Applicant: Worldwide Diamond Trademarks, Canada
Publication: 2013-01-15
Filed: 2007-05-04
Status: granted

A heart shaped diamond possessing a hearts and arrows pattern characteristic comprising: six main crown facets symmetrically aligned relative to one another, with each of the six main crown facets having a straight edge in parallel alignment with a straight edge of another main crown facet disposed opposite thereto; six main pavilion facets aligned at a fixed given angle of approximately 60° to each other and having a symmetrical number of pavilion half facets such that the six main pavilion facets meet at a point corresponding to the symmetrical central of the diamond and a multiple number of crown star facets spaced apart from one another on the surface of the diamond. The pavilion half facets are arranged in pairs polished on the main pavilion facet with a first pavilion half facet in each pair lying at a first angle of preferably 26.25° relative to a second pavilion half facet

in the same pair and with the second pavilion half facet in each pair cut at a second angle of preferably 33.75° relative to the first pavilion half facet in an adjacent pair with which it shares a common boundary.

CN101873813B: Cut gemstone exhibiting excellent optical brilliance
Applicant: -
Publication: 2013-01-23
Filed: 2009-01-22
Status: granted

A gemstone having 65 uniquely arranged and angled facets, 25 of which are In the crown, and 40 of which are in the pavilion. The height of the crown is preferably between 9.5 to 13.5 % of the width of the stone, the total depth of the stone is preferably between 63-70.9% of the width of the stone, and the width of the table is preferably between 60-68% of the width of the stone.

WO2013007605A1: Single crystal diamond substrates for synthesis of single crystal diamond material
Applicant: Element Six Limited, United Kingdom
Publication: 2013-01-17
Filed: 2012-07-05
Status: application

A method of growing synthetic single crystal diamond material, the method comprising: providing a single crystal diamond substrate; and growing synthetic single crystal diamond material on said single crystal diamond substrate, wherein said single crystal diamond substrate is formed of single crystal diamond material which is irradiated prior to growing synthetic single crystal diamond material thereon, and wherein the irradiation comprises irradiating the diamond material to a depth of 5 μm or greater.

WO2013006677A1: Gemstone registration system
Applicant: Gemological Appraisal Association, United States of America
Publication: 2013-01-10
Filed: 2012-07-05
Status: application

A device for producing a reproducible identification pattern of a polished gemstone includes light directing means for directing a focused beam of light onto a gemstone orientated in a particular known manner to produce an output of the internal refraction and reflection characteristics of the gemstone including reflected light beams having particular locations, sizes and intensities. The device also includes automated means for changing a position of the gemstone relative to the focused beam of light; and also a means for recording the output in a manner to record the relative size and location of the

reflected light beams.

US20130016210A1: Gemstone sparkle analysis
Applicant: De Beers Centenary, Switzerland
Publication: 2013-01-17
Filed: 2011-01-26
Status: application

A system is described for obtaining images of a gemstone, and performing quantitative analysis on the images to obtain measures of properties of the gemstone. The system comprises a support structure for supporting the gemstone at an observation position. An illumination structure is arranged to illuminate the gemstone. The illumination structure comprises a plurality of radially dispersed directional light sources directed towards the observation position, the support structure and illumination system being rotatable relative to one another around a rotation axis so that the gemstone can be illuminated by one or more of the directional light sources at each of a plurality of rotational positions, the axis of rotation being normal to a selected facet of the gemstone. An imaging device is directed towards the gemstone for obtaining images of the gemstone at each of the rotational positions, the imaging device having an imaging axis parallel to or coincident with the axis of rotation. An image processor is provided for identifying sparkle regions in the images corresponding to reflections from individual light sources by individual facets and providing a quantitative measure of the gemstone on the basis of properties of the sparkle regions.

US20130010280A1: Gemstone registration system
Applicant: Gemological Appraisal Association, United States of America
Publication: 2013-01-10
Filed: 2012-07-05
Status: application

A device for producing a reproducible identification pattern of a polished gemstone includes light directing means for directing a focused beam of light onto a gemstone orientated in a particular known manner to produce an output of the internal refraction and reflection characteristics of the gemstone including reflected light beams having particular locations, sizes and intensities. The device also includes automated means for changing a position of the gemstone relative to the focused beam of light; and also a means for recording the output in a manner to record the relative size and location of the reflected light beams.

WO2013006676A2: Methods, devices and computer program products for estimating stone-specific attributes using a mobile terminal
Applicant: Adamas Vector, United States of America
Publication: 2013-01-10

Filed: 2012-07-05
Status: application

Methods include receiving a plurality of gemstone values corresponding to a cut gemstone into a graphical user interface of a mobile terminal, computing at least one angle corresponding to the cut gemstone using at least one of the plurality of gemstone values, and displaying a value of the at least one angle to a mobile device user on a display of a mobile device.

US20130001100A1: Ultrasound Assisted Electrochemical Catalyst Removal For Superhard Materials

Applicant: Varel International, United States of America
Publication: 2013-01-03
Filed: 2012-06-26
Status: application

A catalyst removal apparatus and method for removing catalyst from a polycrystalline cutter. The cutter includes a substrate and a cutting table. The apparatus includes a tank forming a cavity therein, an electrolyte fluid occupying the cavity, the cutter, a covering surrounding at least a portion of the cutter's sidewall and extending from at least the substrate's top surface towards the bottom surface, a cathode submersed within the fluid, and a power source. The cutting table is submersed within the fluid and positioned near the cathode, thereby forming a gap there between. The power source is coupled to the cutter and the cathode and electrolyzes the fluid to react with the catalyst in the cutting table to produce a salt. The salt dissolves in the fluid and is removed from the cutter. Optionally, a transducer is sonically coupled to the cutter and emits vibrations to remove salt from the cutting table.

US8348141: Gemstone parcel paper with a viewing window

Applicant: -
Publication: 2013-01-08
Filed: 2010-09-09
Status: granted

A convenient, economical, novel parcel paper for folding to enclose a gemstone is provided, which includes three rectangular sheets of paper (or a paper-like material) and a thin, rectangular substantially transparent viewing pane attached to at least the inner one of the rectangular sheets. The three sheets include an outer cover sheet, a thin central flute, and a thin inner flute. Each of the sheets is configured with an open rectangular viewing window. The viewing pane is attached to the inner flute to form a continuous, unified sheet; thus when the cover, central flute, and inner flute are folded together with their viewing windows aligned, the viewing pane allows observation of the enclosed

gemstone enclosed within the folded parcel paper.

US20130017670A1: Laser processing method and laser processing apparatus
Applicant: Hamamatsu Photonics, Japan
Publication: 2013-01-17
Filed: 2012-08-28
Status: application

A laser processing method comprising a step of irradiating an object to be processed with laser light elliptically polarized with an ellipticity of other than 1 such that a light-converging point of the laser light is located within the object along the major axis of an ellipse indicative of the elliptical polarization of laser light, along a line which the object is intended to be cut, to form a modified region caused by multiphoton absorption within the object, along the line which the object is intended to be cut.

GB2492661A: Single crystal diamond substrates for synthesis of single crystal diamond material
Applicant: Element Six, United Kingdom
Publication: 2013-01-09
Filed: 2012-07-05
Status: application

A method of growing synthetic single crystal diamond material comprises: providing a single crystal diamond substrate; and growing synthetic single crystal diamond material on said single crystal diamond substrate, wherein said single crystal diamond substrate is formed of single crystal diamond material which is irradiated prior to growing synthetic single crystal diamond material thereon, and wherein the irradiation comprises irradiating the diamond material to a depth of 5Âµm or greater. The substrate may be formed from one of: single crystal synthetic HPHT material having a total equivalent isolated nitrogen concentration of 1-800 ppm; single crystal CVD diamond material have a total equivalent isolated nitrogen concentration of 0.005-100 ppm; or a natural diamond material having a total nitrogen concentration of 1-2000 ppm. The method may further comprise cooling the diamond material during the irradiation and annealing the diamond material. A composite substrate array for carrying out the method is also disclosed.

WO2013010538A1: Carbonado
Applicant: -
Publication: 2013-01-24
Filed: 2012-06-20
Status: application

A part of the present invention uses thermal decomposition, of an organic compound, by a heated physical object to produce diamond and/or other carbon allotropes. A physical

object that is in contact with a organic compound is heated to the temperature where the organic compound that comes in contact with the heated physical object, decomposes by thermal decomposition, and the carbon is released from the organic compound, and the carbon accumulate on the heated physical object as diamond and/or other carbon allotropes. The method of claim 1 wherein the physical object is heated by Joule heating. The method of claim 1 wherein the physical object is heated by electromagnetic induction.

GB2492822A: Modifying diamond components by irradiation

Applicant: Element Six, United Kingdom
Publication: 2013-01-16
Filed: 2011-07-14
Status: application

A method of forming a diamond material with a defined vacancy density is disclosed where the method comprises the irradiation of diamond to yield vacancy point defects having a concentration in a range 1 x 1014 to 1 x 1021 vacancies/cm3. The radiation used could be electrons, neutrons, X-rays, gamma rays, protons or alpha particles. An apparatus is disclosed comprising: a diamond component; a mounting for supporting said diamond component; and a controller configured to control one or more functional parameters of the apparatus, wherein the apparatus is configured such that in normal use the diamond component is subjected to thermal, mechanical or electromagnetic stress but substantially no abrasive wear, and wherein the diamond component is formed of at least one portion of irradiated diamond material. Further disclosed is the use of irradiation to increase the crack resistance of diamond.

AU8346039BB: Ornamental diamond having two-stage pavilion

Applicant: Hohoemi Brains
Publication: 2012-12-20
Filed: 2008-01-09
Status: application

An ornamental diamond having a two-stage pavilion. The ornamental diamond is extremely bright and has many reflection patterns when observed from above its table facet or crown surface. The ornamental diamond has the same crown as a round-brilliant-cut diamond has, and has a pavilion divided into first and second pavilions by a horizontal segmentation plane. The second pavilion is an eight-sided pyramid and its lateral faces make second pavilion main facets. The first pavilion is a truncated 16-sided pyramid with its top face located on the horizontal segmentation plane and has lateral faces making first lower girdle facets. First pavilion main facets are extended from the girdle to the intervals between the respective second pavilion main facets through the intervals between the respective first lower girdle facets. Therefore, the ornamental diamond having the two-stage pavilion is far more brilliant than a conventional round-

brilliant-cut diamond and has twice as many reflection patterns as the same has.

JP2012176889A2: System and method for producing synthetic diamond
Applicant: Apollo Diamond
Publication: 2012-09-13
Filed: 2012-05-10
Status: application

Problem to be solved: To provide a synthetic diamond, and to provide a method for preparing and using a synthetic single crystal diamond.
Solution: Synthetic monocrystalline diamond compositions have one or more monocrystalline diamond layers formed by chemical vapor deposition, wherein the layers include 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 a defect. Further, a related method for preparing such compositions, a system for performing such a method, and articles incorporating such a composition are disclosed.

JP2012131707A2: Single crystal diamond, and method for manufacturing the same
Applicant: Sumitomo Electric
Publication: 2012-07-12
Filed: 2012-04-10
Status: application

Problem to be solved: To stably provide a high-quality single crystal diamond useful as a substrate for a semiconductor device, and having a large area and little strain.
Solution: The single crystal diamond is grown by a vapor phase synthesis method, wherein the retardation between two mutually orthogonal linearly polarized lights outgoing from a principal surface being the opposite surface by irradiation of a linearly polarized light regarded as the synthesis of two mutually orthogonal linearly polarized lights on the other principal surface is a maximum of ≤50 nm per 100 μm of a sample thickness across the whole sample.

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Patent News nr. 106 (03-2013)

US20130042648A1: Facet patterns and arrangements for gemstones
Applicant: -
Publication: 2013-02-21
Filed: 2011-08-19
Status: application

The present invention relates to the cut of a gemstone, and particularly to facet patterns and arrangements for modified round brilliant cut gemstones having fifty-eight facets. In one embodiment, a facet pattern for the crown of a gemstone includes an octagonal facet; a plurality of triangular star facets; a plurality of triangular upper main facets; a plurality of upper girdle facets; a plurality of quadrilaterals lower main facets, a plurality of triangular lower main facets, and a plurality of lower girdle facets. Both the lower and upper girdle facets have at least one scalloped edge.

US20130055763A1: Hearts & Arrows SiC Gemstone
Applicant: -
Publication: 2013-03-07
Filed: 2011-09-02
Status: application

The instant application discloses, among other things, a specific set of cutting proportions tailored for the optical characteristics of Silicon Carbide ("SiC") which may produce a "Hearts & Arrows" reflection pattern.

US8381545: Triangular star shaped diamond having hearts and arrows pattern
Applicant: Worldwide Diamond Trademark, Canada
Publication: 2013-02-26
Filed: 2007-05-04
Status: granted

A triangular star shaped diamond adapted to display a hearts and arrows pattern when exposed to light comparable to the hearts and arrows pattern in a round diamond, comprising: six main crown facets, twelve crown half facets, a table facet, six main pavilion facets and an even number of main girdle facets separating the crown facets from the pavilion facets with each main crown facet having a symmetrical main crown

facet in an opposing relationship and at least one edge in parallel alignment with an edge of the opposing main crown facet.

US20130038859A1: Reflected dark field method and apparatus
Applicant: Gemological Institute of America (GIA), United States of America
Publication: 2013-02-14
Filed: 2012-10-12
Status: application

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

US20130038713A1: Reflected dark field method and apparatus
Applicant: Gemological Institute of America (GIA), United States of America
Publication: 2013-02-14
Filed: 2012-10-12
Status: application

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

US8376566: Method and apparatus for object viewing, observation, inspection, identification, and verification

Applicant: -
Publication: 2013-02-19
Filed: 2011-04-22
Status: granted

In an object verifier having a housing and an object holder, an object may be placed in the object holder for observation by an operator. The object is illuminated using a collimated beam of white light that is generated by a light generator. The collimated beam of white light is passed through a beam splitter with the two portions of the collimated beam of white light presented to the object at a 90 degree angle one from the other. The interior of the housing includes a reflective surface for maximal illumination of the object. The observer may view the illuminated object through a viewing window and/or through a magnification window. The magnification window provides for the viewing of the object in greater detail.

USD676784: Multiple facet gemstone
Applicant: Rosy Blue, United States of America
Publication: 2013-02-26
Filed: 2012-03-22
Status: granted

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

USD676350: Multiple facet gemstone
Applicant: Rosy Blue, United States of America
Publication: 2013-02-19
Filed: 2012-03-22
Status: granted

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

USD675546: Multiple facet gemstone
Applicant: Rosy Blue, United States of America
Publication: 2013-02-05
Filed: 2012-03-22
Status: granted

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

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Patent News nr. 107 (04-2013)

BE1019975A3: Edelsteen van natuurlijke diamant en werkwijze daarbij toegepast.
Applicant: Diamond Trading NV, Belgium
Publication: 2013-03-05
Filed: 2011-05-16
Status: application

US20130078607A1: Computer-implemented method of and system for teaching an untrained observer to evaluate a gemstone
Applicant: -
Publication: 2013-03-28
Filed: 2012-09-14
Status: application

A computer-implemented method teaches a user to evaluate a gemstone, such as a cut diamond. The method includes providing a computer system connected to an apparatus capable of capturing an image of a gemstone. The computer system is arranged to process a received image of a gemstone to determine one or more optical properties of the gemstone. In one aspect, the method presents on a display of the computer system a series of pre-stored screens comprising a graphical representation how the cut of a gemstone affects its light handling ability, and a user interface screen. The user interface screen allows the user to control the operation of the apparatus to measure the one or more optical properties of a particular gemstone provided to the apparatus, to view an image of the gemstone measured, and to view representations of the measured one or more optical properties.

US8402066: Method and system for providing a clarity grade for a gem
Applicant: Gemological Institute of America (GIA), United States of America
Publication: 2013-03-19
Filed: 2008-10-07
Status: granted

A method and system for generating a clarity grading look-up table includes collecting actual inclusion parameter data for a plurality of gems, where the actual inclusion parameter data includes an actual clarity grade and an actual inclusion parameter data combination. A mathematical relationship between a clarity grade and a particular

inclusion parameter combination is then extrapolated from the actual inclusion parameter data. A derived clarity grade is then assigned to a plurality of inclusion parameter combinations as a function of the mathematical relationship and a set of inputted inclusion parameters. Also, a method and system for providing a clarity grade includes receiving a plurality of inclusion characteristics associated with a gem and parameterizing each of the inclusion characteristics, so that a parameter value is assigned to each inclusion characteristic. The parameter values are then input to a mathematical formula so as to provide a parameterized clarity grade for the gem.

US8398947: Separation of diamond from gangue minerals
Applicant: Mineral and Coal Technologies, United States of America
Publication: 2013-03-19
Filed: 2011-08-27
Status: granted

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

US20130064459A1: Gem pattern matching algorithm to determine the percentage match of a target gem pattern to a database of gem patterns
Applicant: Gemological Appraisal Association, United States of America
Publication: 2013-03-14
Filed: 2012-08-16
Status: application

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

CN102198621B: Precision numerical control multi-station gem grinding machine
Applicant: -
Publication: 2013-03-20
Filed: 2011-04-19

Status: granted

The invention discloses a precision numerical control multi-station gem grinding machine, which comprises programmable controlled change layer and change surface gem chucks and gem chuck lifting mechanisms; the gem chucks are arranged mutually in 120 degrees on the circumference according to three stations of loading/unloading, grinding and polishing; the gem chuck of each station is arranged on a rotary pedestal which is switched among the stations according to the programs and swings left and right during processing through the respective lifting mechanism; the rotary pedestal is arranged on a worktable; and a loading/unloading area, a program controlled grinding disk and a polishing disk are arranged corresponding to the stations. The three-station structure is adopted in the gem grinding machine, the gem grinding machine is also provided with a main control system and three station control systems, and each station is provided with a change layer and a change surface; fast feed, fast return, service feed and service return can be performed; the grinding speed and the polishing speed are infinitely variable; all programs and operations are controlled by adopting a programmable logic controller (PLC); and program conversion is automatically finished, and change layer and change surface grinding and polishing of a gem blank are automatically finished, so that the operation program of the whole machine is automatic.

WO2013031772A1: Diamond polishing device
Applicant: Kochi Fel Co., Japan
Publication: 2013-03-07
Filed: 2012-08-28
Status: application

Provided is a diamond polishing device that is capable of preventing damage of rough diamonds by limiting the generation of impact forces between the polishing plate and the rough diamond. The diamond polishing device is provided with: a polishing plate having a polishing surface that rotates horizontally; a holder that holds a rough diamond, which is the object of the polishing, in contact with the polishing surface of the polishing plate; and a screw base that supports the holder. The holder has two supporting parts that are supported on two screws that stand on the screw base, and a mounting part on the tip of which the rough diamond is mounted. By rotating each of the screws, the positions of each supporting part with respect to the respective screws in the axial direction can be adjusted. For the polishing plate, the surface roughness of the polishing surface is 1 μm Ra or less.

WO2013031907A1: Single crystal diamond and method for producing same
Applicant: Sumitomo Electric Industries, Japan
Publication: 2013-03-07
Filed: 2012-08-30
Status: application

This single crystal diamond is configured of carbon that has a carbon isotope 12C concentration of 99.9% by mass or more and a plurality of unavoidable impurities other than carbon. The unavoidable impurities include nitrogen, boron, hydrogen and nickel; and the total content of nitrogen, boron and hydrogen among the plurality of unavoidable impurities is set to 0.01% by mass or less. In order to produce the single crystal diamond, a hydrocarbon gas having a carbon isotope 12C concentration of 99.9% by mass or more is first subjected to a denitrification treatment. The hydrocarbon gas having been subjected to the denitrification treatment is thermally decomposed on a substrate within a vacuum chamber, for example, at a temperature from 1,200°C to 2,300°C (inclusive), thereby preparing a carbon starting material. Diamond is synthesized with use of this carbon starting material, and a seed crystal is cut out of the diamond. This seed crystal is contained in a cell together with a solvent and a carbon source, and single crystal diamond is grown from the seed crystal by a high-temperature high-pressure synthesis method.

JP2012162454A2: Diamond single crystal, and method for producing the same
Applicant: Sumitomo Electric
Publication: 2012-08-30
Filed: 2012-04-09
Status: application

Problem to be solved: To provide a diamond single crystal suitable for mechanical applications such as a cutting tool and a wear-resistant tool, and functional applications such as a semiconductor material, an electronic component and an optical component, and to provide a method for producing the diamond single crystal.
Solution: The diamond single crystal shows a peak absorption coefficient of 0.05 to 10 cm-1 at a wavenumber of 1,332 cm-1 (wavelength of 7.5 μm) over the entire crystal, and is obtained by a chemical vapor deposition method. The single crystal is obtained by adjusting composition ratios of elements in a vapor phase at the chemical vapor deposition of the single crystal to be carbon atom concentration with respect to a hydrogen atom of 2 to 10%, nitrogen atom concentration with respect to a carbon atom of 0.1 to 6%, and oxygen atom concentration with respect to a carbon atom of 0.1 to 5%.

USD678113: Multiple facet gemstone
Applicant: Rosy Blue, United States of America
Publication: 2013-03-19
Filed: 2012-04-09
Status: granted

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

USD678112: Multiple facet gemstone

Applicant: Rosy Blue, United States of America
Publication: 2013-03-19
Filed: 2012-04-09
Status: granted
The ornamental design for a multiple facet gemstone, as shown.

HK1127791A1: Single crystal diamond
Applicant: Element Six, United Kingdom
Publication: 2013-03-15
Filed: 2009-06-09
Status: application

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Patent News nr. 108 (05-2013)

WO2013056678A1: Multicolored synthetic gemstone and preparation method therefor

Applicant: -
Publication: 2013-04-25
Filed: 2012-10-19
Status: application

A multicolored synthetic gemstone comprises an upper layer of a lead-free glass having a colored coating being connected by a glue to a lower layer of lead-free glass, which structure is made solid, shaped, cut and ground at a variety of angles to form a multicolored synthetic gemstone. Different effects of color can be obtained by means of varying the thickness of the coating, the positioning of the upper and lower layers when connecting same, and the color of the glue used therefor. Also disclosed is a method for the manufacture of the multicolored synthetic gemstone, whereby an upper layer of a lead-free glass is provided with a colored coating, then is connected by a glue to a lower layer of lead-free glass; the resultant structure is made solid, shaped, cut and ground at a variety of angles to form a multicolored synthetic gemstone. The underside of the multicolored synthetic gemstone can be coated or not coated, and said gemstone can be used in bracelets, on clothing, footwear, handbags and other craft objects. The inter-refraction of four to five layers in the multicolored synthetic gemstone causes different and changing colors to be observed from different angles and a deep crystalline effect is achieved by refraction through a very thin crystal layer; a strong eye-catching effect is achieved by the more than ten thousand different hues produced. The cost is low, few steps are required in production, sample production is simple and fast, and the product is lead-free, thus meeting ROHS environment standards for lead content.

EP2583577A1: Diamond and a method of setting a diamond

Applicant: Mattar, Rany, Israel
Publication: 2013-04-24
Filed: 2007-11-20
Status: application

The present invention relates to a diamond comprising: a girdle defining the periphery of a planar surface; a pavilion on a first side of the girdle; a crown on a second side of the girdle; and at least one groove or notch formed in the crown parallel to said periphery.

EP2422640A3: Multifaceted gemstones with connecting link
Applicant: Firestone Inc., United States of America
Publication: 2013-03-20
Filed: 2010-12-27
Status: application

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

EP2412266A3: Multi-faceted gemstone for multi-stone jewelry item
Applicant: Firestone Inc., United States of America
Publication: 2013-03-20
Filed: 2010-12-27
Status: application

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

CN102046394B: A decorative substrate, especially an artificial jewellery stone with a colour effect, and a method for achieving the colour effect for a decorative transparent substrate
Applicant: -
Publication: 2013-03-27
Filed: 2009-06-01
Status: granted

The invention concerns a decorative substrate, especially an artificial jewellery stone having a colour effect, being formed by a transparent substrate which comprises the following layers on the back side deposited in the following order from the back side of the substrate: an optically modifying layer, a reflection layer formed by at least one metal or by an alloy from a group including Au, Ag, Cu, Al, Cr, Ti, aluminum bronzes and alloys of Au, Ag and Cu, an interposed layer having a thickness of 10 to 100 nm and a layer of a protecting varnish. Between the optically modifying layer and the reflection layer is alternatively comprised an adhesive layers formed by at least one metal oxide

from a group of metals including Al, Ti, Cr and Sn. The invention concerns also a method for achieving the colour effect for a decorative transparent substrate.

EP2451611B1: Gemstone alignment
Applicant: De Beers Centenary AG, Switzerland
Publication: 2013-05-01
Filed: 2010-07-07
Status: granted

Apparatus for aligning an article with a predetermined vertical axis, comprising: a nozzle, extending upwardly and aligned with the vertical axis in use and configured to allow the article to settle in an upper side thereof under the action of gravity so that the article is supported by the nozzle at a point of minimum potential energy; a fluid supply system for supplying fluid to the nozzle under sufficient pressure to support the article within or above the nozzle, the fluid supply system including a fluid pressure control system for controlling the pressure of fluid supplied to the nozzle.

US8429021: Method and system for receiving an item during a precious stone and metal appraisal
Applicant: Ward Kraft, United States of America
Publication: 2013-04-23
Filed: 2011-09-26
Status: granted

A method for appraising at a retail location an item having one of a precious stone, a semi-precious stone, a precious metal, or a semi-precious metal includes the step of providing a variety of food products at the retail location. Then, by a transaction point computer at the retail location, the item to be appraised is received, along with the consumer's selection of a food product. The item's composition is determined using an evaluating device, and an exchange value is associated with the item using data obtained by the evaluating device and market data obtained over a network. The exchange value of the item is relayed to the consumer after the food product selected by the consumer has been delivered.

WO2013041910A1: Device for supporting natural and/or artificial stones and method for making jewellery or costume jewellery items
Applicant: -
Publication: 2013-03-28
Filed: 2011-09-22
Status: application

In order to support natural and/or artificial stones for the making of jewellery or costume jewellery items, a support element is provided, which has an elastically yielding seat, as

well as a setting element with a portion of ductile material for holding one or more stones and with a coupling portion with an interlocking profile which is coupled by means of elastic yielding to the seat of the support element. Thereby, low processing costs, a firm fixing of the stone and an adaptability to varying sizes are achieved.

JP2012239883A2: Gemstone of natural diamond, and method applied thereto
Applicant: Diamond Trading NV
Publication: 2012-12-10
Filed: 2012-03-28
Status: application

Problem to be solved: To provide a method of processing natural diamond by which a gemstone reflects more light without requiring a lot of time.
Solution: The gemstone has two parallel faces and a geometric plane that coincides with two parallel faces defines the volume of the gemstone, and a number of facets start from the two parallel faces. Each facet is processed and polished to be parallel to an opposite facet or parallel to a connecting end edge of two other facets.

JP2012250865A2: Method for manufacturing single crystal, and seed crystal fixing agent
Applicant: Sumitomo Electric Ind
Publication: 2012-12-20
Filed: 2011-06-01
Status: application

Problem to be solved: To provide a method for manufacturing a single crystal, which can grow a high quality single crystal, and to provide a seed crystal fixing agent used in the same.
Solution: The backside of a seed crystal is fixed on a pedestal by using the seed crystal fixing agent. When the backside of the seed crystal is fixed, the seed crystal fixing agent is cured. The seed crystal fixing agent includes a resin becoming a hardly-graphitized carbon by heating, and a diamond microparticle. A single crystal is grown on the seed crystal fixed on the pedestal.

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Patent News nr. 109 (06-2013)

WO2013069317A1: Gemstone
Applicant: K-uno, Japan
Publication: 2013-05-16
Filed: 2012-04-05
Status: application

A gemstone wherein: a flat table is formed in a substantially regular 24-sided polygonal shape that substantially forms a circle; multiple ridge lines, which on planar view extend from the circumference of the table to the girdle in the radial direction of the table, are formed on the circumferential surface of the crown; the areas between the ridge lines are facet groups, which are configured from multiple microfacets; a small circular facet obtained from a single substantially circular plane that is smaller than the table is formed on the circumferential surface in contact with the table; and in the crown, 24 facet groups are disposed side by side on the circumferential surface, the small circular facet is provided extending across three or more facet groups, and the portion of said three or more facet groups that is missing is formed in the shape of the small circular facet.

EP2329739A8: Gemstone
Applicant: Metha, Paras Paresh, Mumbai, India
Publication: 2013-05-15
Filed: 2010-11-30
Status: application

The invention relates to a gemstone comprises a girdle, a crown and a pavilion. The crown has a table, ten star facets surrounding the table, ten bezel facets aligned between the star facets and twenty upper girdle facets aligned between the bezel facets. The pavilion is provided with ten pavilion main facets, twenty pavilion hook facets aligned between the pavilion main facets and ten pavilion star facets aligned between the pavilion hook facets. The invention also relates to a method of cutting the gemstone.

US20130130044A1: Method for forming a decorative coating on a gemstone, a decorative coating on a gemstone, and uses of the same
Applicant: Beneq Oy, Vantaa, Finland
Publication: 2013-05-23
Filed: 2010-11-19

Status: application

A decorative coating and a method for forming a decorative coating on a gemstone to change the natural visual appearance of the gemstone. The decorative coating comprises an optically absorbing film. Depositing the absorbing film on the substrate comprises the alternating steps of introducing a first precursor to the reaction space such that at least a portion of the first precursor gets adsorbed onto the surface of the substrate, and subsequently purging the reaction space, and introducing a second precursor to the reaction space such that at least a portion of the second precursor reacts with the portion of the first precursor adsorbed onto the surface of the substrate to form a conformal absorbing film on the substrate comprising the gemstone, and subsequently purging the reaction space. The material of the absorbing film is selected from the group of oxides, carbides, noble metals or a mixture thereof.

US20130125585A1: Heart shaped diamond cut having hearts and arrows pattern
Applicant: Worldwide Diamond Trademarks, Canada
Publication: 2013-05-23
Filed: 2013-01-14
Status: application

A heart shaped diamond possessing a hearts and arrows pattern characteristic comprising: eight main crown facets symmetrically aligned relative to one another, with each of the eight main crown facets having a straight edge in parallel alignment with a straight edge of another main crown facet disposed opposite thereto; eight main pavilion facets aligned at a fixed given angle of approximately 45° to each other and converging at a common point corresponding to the center of the diamond; sixteen pavilion half facets aligned at 22.5° with respect to each other, a girdle which is non-uniform and has a substantially unequal thickness throughout the diamond, a table facet, and a multiple number of crown star facets in an arrangement surrounding the table facet.

EP2586566A1: Systems and methods for manipulating objects
Applicant: Soenen Controls, Belgium
Publication: 2013-05-01
Filed: 2012-10-24
Status: application

The invention relates to integrated systems and corresponding computer interfaces and parts of such systems for manipulating 3D physical objects, such manipulating including (as part of pre-processing) orientating or positioning, (post-) processing of objects as part of a treatment of said objects, and in particular relates to devices such as holders, for use with such systems, the related methods and software (and related data structures) for use with and/or embedded in such systems to realize such methods. The invention provides for means and approaches for handling complex manipulation steps by enabling use of viewing methods suited therefore while providing an integrated approach wherein

identification of holders whereon objects are fixed on gets combined with position data, exchanged to avoid human errors.

EP1867760B1: Method for manufacturing diamond single crystal substrate, and diamond single crystal substrate

Applicant: Sumitomo Electric Industries, Japan
Publication: 2013-05-22
Filed: 2006-03-23
Status: granted

From equivalent EP1867760A3: A method for manufacturing a diamond single crystal substrate, in which a single crystal is grown from a diamond single crystal serving as a seed substrate by vapor phase synthesis, said method comprising: preparing a diamond single crystal seed substrate which has a main surface whose planar orientation falls within an inclination range of not more than 8 degrees relative to a {100} plane or a {111} plane, as a seed substrate; forming a plurality of planes of different.orientation which are inclined in the outer peripheral direction of the main surface relative to the main surface on one side of this seed substrate, by machining; and then growing a diamond single crystal by vapor phase synthesis.

US20130126400A1: Method for separating minerals according to the luminescent properties thereof

Applicant: Research and Production Enterprise "Bourevestnik", Russian Federation
Publication: 2013-05-23
Filed: 2011-11-08
Status: application

The method relates to the field of mineral enrichment. It involves establishing threshold values of the intensity of a luminescence signal arising during the action of a pulse of exciting radiation on a material being separated and after a specified time following the end of the exciting pulse, and, during the processing of the recorded signal, first of all determining the value of the intensity of the luminescence signal, comparing the value obtained with the specified threshold value and, in the event of the threshold value being exceeded, processing the signal in order to determine the value of the selected separation criterion, comparing the processing result with the specified threshold value and isolating the mineral to be enriched from the material being separated if the comparison result satisfies the specified criterion; in the event of the value of the intensity of the luminescence signal after a specified time following the end of the exciting pulse being less than the threshold value thereof, determining the value of the intensity of the luminescence signal arising during the pulse of exciting radiation, comparing said value with the threshold value specified therefor and isolating the mineral to be enriched from the material being separated if the threshold value is exceeded.

US8436986: Apparatus and methods for assessment, evaluation and grading of gemstones

Applicant: Opal Producers Australia Limited, Australia
Publication: 2013-05-07
Filed: 2008-04-02
Status: granted

An apparatus for assessment, evaluation and grading of gemstones has a stage upon which a gemstone may be supported, the stage being enclosed in a housing that is impervious to light. At least one light source located in the housing is adapted to project incident light onto the gemstone. There are means for rotating and tilting the stage so as to vary the orientation of the gemstone to the incident light. A digital camera is located in the housing adjacent the or each light source and is adapted to take images of the gemstone based on reflection and/or refraction of the incident light. There are also information processing means for calibrating and analyzing the images, with the information processing means being programmed with an instruction set for color calibrating the images and then analyzing the color calibrated images by segmentation and histogram measurement.

JP2013034725A2: Diamond cut evaluate program and method

Applicant: Kojima Akira
Publication: 2013-02-21
Filed: 2011-08-09
Status: application

Problem to be solved: To provide a diamond cut evaluate program and a diamond cut evaluate method for outputting an objective reference to a cut evaluation by digitizing and visualizing a cut (shape) being one of four factors when evaluating a diamond as a jewelry.
Solution: The diamond cut evaluate program and the diamond cut evaluate method is constituted by carrying out following steps. (A) a step for three-dimensionally measuring the shape of the diamond and obtaining three-dimensional shape data, (B) a step for restoring the shape from the obtained three-dimensional data and simulating an advancing passage of a light beam by irradiating a simulated light beam to the restored shape, (C) a step for evaluating the right and wrong of the diamond cut based of the simulation of the advancing passage of the simulated light beam, and (D) a step for outputting an evaluation result.

JP2013001601A2: Method and apparatus for growing diamond crystal

Applicant: National Institute For Materials Science
Publication: 2013-01-07
Filed: 2011-06-16
Status: application

Problem to be solved: To provide a method and an apparatus for growing a diamond crystal where solid conversion efficiency from a raw material gas to the crystal is enhanced.

Solution: In the method for growing the diamond crystal that the diamond crystal is grown on a substrate from the raw material gas in a reaction chamber by a chemical vapor deposition method, the raw material gas is supplied into the reaction chamber at a raw material gas supplying flow rate G0 satisfied with equation (1): $G0 \leq 10 \times S \times h$ (wherein, S is the area of a substrate; and h is a crystal growing rate) and exhausting from the reaction chamber is performed at an exhausting flow rate G2 satisfied with equation (2): $G2 \leq 0.90 \times G0$. The concentration of the raw material gas is optimized and crystallization efficiency is enhanced by using the method for growing the diamond crystal, the recovery efficiency of the raw material is enhanced by suppressing the exhausting of an unreacted raw material gas and then the solid conversion efficiency from the raw material gas to the diamond crystal can be enhanced.

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Patent News nr. 110 (07-2013)

BE1020201A5: Werkwijze voor het bepalen van een slijpvorm voor een edelsteen
Applicant: Octonus Dia Tech Private, India
Publication: 2013-06-04
Filed: 2011-07-14
Status: 20 year patent-modified claims

Method for determining a cut for a gemstone, comprising selecting a generic shape for the cut; selecting a plurality of cut designs of a group of cut designs having the selected generic shape; simulating a number of optical metrics for the plurality of cut designs using simulation models having modeling coefficients; selecting one or more cut designs of the plurality of cut designs based on the simulated optical metrics; varying the geometry parameters for each selected cut design within a range, simulating a number of optical metrics for said range of geometry parameters, and determining an optimized cut design having optimized geometry parameters based on the simulated number of optical metrics for said range; cutting and polishing of the gemstone using the optimized cut design having the optimized geometry parameters; analyzing the visual appearance of the polished gemstone; changing or adapting the simulation models and/or the modeling coefficients thereof and/or the range for varying the geometry parameters and/or a cut design of the plurality of cut designs, and/or adding one or more new cut designs to the group of cut designs, on the basis of the analysis of the visual appearance

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WO2013096450A1: Step heating process for growing high quality diamond
Applicant: The Gemesis Diamond Company, United States of America
Publication: 2013-06-27
Filed: 2012-12-19
Status: application

Disclosed is a method of growing a diamond, including the steps of providing a diamond seed in a reaction chamber; providing a protective layer above the diamond seed; providing a catalyst above the protective layer; providing a carbon source above the catalyst; applying pressure to the reaction chamber; heating the catalyst to a first temperature; holding the first temperature for a first duration; heating the catalyst to a second temperature; and holding the second temperature for a second duration.

WO2013087697A1: Single crystal CVD synthetic diamond material

Applicant: Element Six Limited, United Kingdom
Publication: 2013-06-20
Filed: 2012-12-12
Status: application

A single crystal CVD synthetic diamond material comprising: a total as-grown nitrogen concentration equal to or greater than 5 ppm, and a uniform distribution of defects, wherein said uniform distribution of defects is defined by one or more of the following characteristics: (i) the total nitrogen concentration, when mapped by secondary ion mass spectrometry (SIMS) over an area equal to or greater than 50 x 50 mum using an analysis area of 10 mum or less, possesses a point-to-point variation of less than 30% of an average total nitrogen concentration value, or when mapped by SIMS over an area equal to or greater than 200 x 200 mum using an analysis area of 60 muiotaeta or less, possesses a point-to-point variation of less than 30% of an average total nitrogen concentration value; (ii) an as-grown nitrogen-vacancy defect (NV) concentration equal to or greater than 50 ppb as measured using 77K UV-visible absorption measurements, wherein the nitrogen-vacancy defects are uniformly distributed through the synthetic single crystal CVD diamond material such that, when excited using a 514 nm laser excitation source of spot size equal to or less than 10 muiotaeta at room temperature using a 50 mW continuous wave laser, and mapped over an area equal to or greater than 50 x 50 mum with a data interval less than 10 muiotaeta, there is a low point-to-point variation wherein the intensity area ratio of nitrogen vacancy photoluminescence peaks between regions of high photoluminescent intensity and regions of low photolominescent intensity is <2x for either the 575 nm photoluminescent peak (NV0) or the 637 nm photoluminescent peak (NV); (iii) a variation in Raman intensity such that, when excited using a 514 nm laser excitation source (resulting in a Raman peak at 552.4 nm) of spot size equal to or less than 10 mum at room temperature using a 50 mW continuous wave laser, and mapped over an area equal to or greater than 50 x 50 mum with a data interval less than 10 mum, there is a low point-to-point variation wherein the ratio of Raman peak areas between regions of low Raman intensity and high Raman intensity is <1.25x; (iv) an as-grown nitrogen-vacancy defect (NV) concentration equal to or greater than 50 ppb as measured using 77K UV-visible absorption measurements, wherein, when excited using a 514 nm excitation source of spot size equal to or less than 10 mum at 77K using a 50 mW continuous wave laser, gives an intensity at 575 nm corresponding to NV0 greater than 120 times a Raman intensity at 552.4 nm, and/or an intensity at 637 nm corresponding to NV- greater than 200 times the Raman intensity at 552.4 nm; (v) a single substitutional nitrogen defect (Ns) concentration equal to or greater than 5 ppm, wherein the single substitutional nitrogen defects are uniformly distributed through the synthetic single crystal CVD diamond material such that by using a 1344 cm-1 infrared absorption feature and sampling an area greater than an area of 0.5 mm2, the variation is lower than 80%, as deduced by dividing the standard deviation by the mean value; (vi) a variation in red luminescence intensity, as defined by a standard deviation divided by a mean value, is less than 15%; (vii) a mean standard deviation in neutral single substitutional nitrogen concentration of less than 80%; and (viii) a colour intensity as measured using a histogram from a microscopy image with a mean gray value of greater than 50, wherein the colour intensity is uniform through the single crystal CVD synthetic

diamond material such that the variation in gray colour, as characterised by the gray value standard deviation divided by the gray value mean, is less than 40%.

US20130160700A1: Step heating process for growing high quality diamond
Applicant: Gemesis Diamond Company, United States of America
Publication: 2013-06-27
Filed: 2011-12-21
Status: application

Disclosed is a method of growing a diamond, including the steps of providing a diamond seed in a reaction chamber; providing a protective layer above the diamond seed; providing a catalyst above the protective layer; providing a carbon source above the catalyst; applying pressure to the reaction chamber; heating the catalyst to a first temperature; holding the first temperature for a first duration; heating the catalyst to a second temperature; and holding the second temperature for a second duration.

US8471176: Laser machine for examination, planning and marking raw diamond
Applicant: Patel, Arvindbhai, India
Publication: 2013-06-25
Filed: 2002-10-01
Status: granted

Because of extreme hardness, diamonds have a number of important industrial applications. Generally experts work on it. Experts do marking after examining each rough diamond to decide how it should be cut to yield the greatest value. But in this process, there can be lots of wastage as it is only an image of the stone in the mind of the person. The present invention comprises Laser planner which scans each and every point of diamond by rotating it 360° and thus gives individual coordinate of that diamond. It shows us the wire frame image on the computer monitor. is a machine to scan the stone and to plan and mark for the best-fit diamond from that stone. All the data of the diamond is stored in the computer. It is material saving, time saving, mass processing increase in productivity.

US8460464: Method for producing single crystalline diamonds
Applicant: Bhandari, Rajneesh; Jaipur Rajasthan, India
Publication: 2013-06-11
Filed: 2009-07-20
Status: granted

A method for producing one or more single crystalline diamonds. The method comprises placing one or more substrates on a substrate holder in chemical vapor vaporization (CVD) chamber. A mixture of gases including at least one gas having a carbon component is provided adjacent to the one or more substrates in the CVD chamber.

Thereafter, the mixture of gases is exposed to microwave radiation to generate a plasma. Reactive species of nitrogen produced in a remote reactive gas generator are introduced in the plasma. Then, the one or more substrates are exposed to the plasma, such that diamond growth occurs at a rate of 10 to 100 microns per hour, to produce one or more single crystalline diamonds.

US8477293: Method and apparatus for rapidly cooling a gem, including two stage cooling

Applicant: Gemological Institute of America (GIA), United States of America
Publication: 2013-07-02
Filed: 2009-02-27
Status: granted

A cooling apparatus includes a container configured to contain a coolant within a space. The apparatus further includes a cooling block positioned substantially within the space and having a high heat capacity such that the space not occupied by the cooling block is filled with a coolant to a level at or below the top of the cooling block, and a placement structure having high thermal conductivity positioned on top of the cooling block and outside of the space. A method for cooling an object is also provided, which includes inserting a coolant into a container configured to contain the coolant within a space, and placing the object on a placement structure outside the space. For this method, the placement structure has a high thermal conductivity and is coupled to a cooling block, the cooling block having a high heat capacity and positioned substantially within the space. A two-stage cooling apparatus and method is also described.

USD684086: Multiple facet gemstone

Applicant: Rosy Blue, United States of America
Publication: 2013-06-11
Filed: 2012-04-09
Status: granted

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

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Patent News nr. 111 (08/09-2013)

US8479538: Enhancing the optical characteristics of a gemstone
Applicant: California Institute of Technology, United States of America
Publication: 2013-07-09
Filed: 2011-10-05
Status: granted

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.

US20130213090A1: Hearts & Arrows SiC Cushion-Cut Gemstone
Applicant: -
Publication: 2013-08-22
Filed: 2012-02-20
Status: application

The instant application discloses, among other things, a specific set of cutting proportions tailored for the optical characteristics of Silicon Carbide ("SiC") cushion-cut gemstone which may produce a "Hearts & Arrows" reflection pattern.

RU2486853C2: Method of faceting diamonds with culet
Applicant: Chankin Anton Aleksandrovich, Russian Federation
Publication: 2013-07-10
Filed: 2011-10-10
Status: patent for invention (2nd publ.)

Field: process engineering.
Substance: invention is intended for use in production of jewelry. Proposed method comprises faceting round diamond to form a culet. Inner taper with solid angle of 98.5° is ground and polished in said culet.
Effect: complete reflection of light from cullet to create extra stone brilliance.

EP2634295A1: Method for producing gemstones from silicon carbide

Applicant: Obshestvo Ogranichennoj Otvetstvennostju "Grannik", Russian Federation
Publication: 2013-09-04
Filed: 2011-08-18
Status: application

The invention relates to growing and processing monocrystals. Silicon carbide produced by the method of the present invention can be used not only for the electronic industry and jewelry-making but also as glass for watches or watchcase. The method comprises simultaneously growing a plurality of moissanite crystal blanks in a honeycomb mold of molding graphite, separating the blanks into individual crystals, faceting, grinding and polishing the crystals. Prior to faceting, the blanks are glued onto a mandrel with their one side and then-with the reverse side thereof. Polishing is carried out on a ceramic wheel rotating at a rate of 200 to 300 rpm using diamond powder spray with a grain size of 0.125-0.45 μm to ensure that the depth of scratch marks be less than the length of a light wave in the visible part of the spectrum, and the cut and cleaved edges and defective blanks unsuitable for faceting are pulverized and returned to the stage of growing.

US20130228120A1: Device and method for growing diamond in a liquid phase
Applicant: -
Publication: 2013-09-05
Filed: 2012-08-28
Status: application

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

US20130220214A1: Base material for growing single crystal diamond and method for producing single crystal diamond substrate
Applicant: Shin-Etsu Chemical, Japan
Publication: 2013-08-29
Filed: 2013-03-18
Status: application

The present invention is a base material for growing a single crystal diamond comprising a single crystal silicon substrate, a MgO film heteroepitaxially grown on a side of the single crystal silicon substrate where the single crystal diamond is to be grown, and an

iridium film or a rhodium film heteroepitaxially grown on the MgO film. As a result, there is provided a base material for growing a single crystal diamond and a method for producing a single crystal diamond substrate which can grow the single crystal diamond having a large area and good crystallinity and produce a high quality single crystal diamond substrate at low cost.

US20130217564A1: Method for synthesizing diamond
Applicant: -
Publication: 2013-08-22
Filed: 2011-03-16
Status: application

A method of synthesizing diamond, the method comprising; (i) providing, in the presence of an atomic hydrogen plasma and/or in the presence of atomic hydrogen radicals, in a dissolution zone a liquid metal saturated with carbon with respect to graphite precipitation; (ii) transferring at least a portion of the liquid metal from the dissolution zone to a deposition zone, (vi) exposing the liquid metal in the deposition zone to atomic hydrogen plasma and/or to atomic hydrogen radicals, the temperature of the liquid metal in the deposition zone being lower than the temperature of the liquid metal in the dissolution zone such that the liquid metal in the deposition zone is saturated, preferably supersaturated, with carbon with respect to diamond precipitation; (vii) precipitating carbon from the liquid metal in the deposition zone to synthesize diamond; and (viii) optionally removing the synthesized diamond from the metal.

US20130192172A1: Authentication, security and/or marketing display kit for a precious gem and method
Applicant: S. A. Gems Distributors, United States of America
Publication: 2013-08-01
Filed: 2013-01-09
Status: application

A new system of packaging and offering precious gems for sale are disclosed. A precious gem and an abbreviated certificate of authenticity about that gem are sealed within an at least partly see-through security case. The sealed security case is secured inside of an enclosed compartment in a security carton, and the gem and the abbreviated certificate of authenticity are visible through one or more windows in the security carton. Additional information about the gem is stored in a storage compartment in the security carton, which is separately accessible from the enclosed compartment. A retailer displays and offers the gem for sale directly to end consumers in the display package, and the consumer is assured by the display package that the gem has the characteristics disclosed on the abbreviated certificate of authenticity without requiring an intermediate local jeweler to verify the characteristics.

US8514377: Detection of chemical vapor deposition grown diamond
Applicant: SCIO Diamond Technology Corporation, United States of America
Publication: 2013-08-20
Filed: 2012-03-12
Status: granted

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

US20130204681A1: Combination Retailing System For Appraising Precious Stones And Metals And Dispensing Gift Cards, Coupons And The Like
Applicant: Ward Kraft, United States of America
Publication: 2013-08-08
Filed: 2013-03-14
Status: application

A system for incentivizing purchases by consumers comprises a kiosk configured to appraise an item having one constituent selected from the group consisting of a precious stone, a semi-precious stone, a precious metal, and a semi-precious metal. A composition of the item is determined using an evaluating device. A cash value is associated with the item using data obtained by the evaluating device and market data obtained over a network, and an exchange value of the item is determined by subtracting a processing fee from the cash value. At least one of the cash value and the exchange value is relayed to the consumer on an output device. The consumer is asked to select via an input device between at least a first offer and a second offer in exchange for the item.

US8514377: Detection of chemical vapor deposition grown diamond
Applicant: SCIO Diamond Technology Corporation, United States of America
Publication: 2013-08-20
Filed: 2012-03-12
Status: granted

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

US20130192579A1: Gemstone production from CVD diamond plate
Applicant: SCIO Diamond Technology Corporation, United States of America

Publication: 2013-08-01
Filed: 2012-12-31
Status: application

A method of producing gemstones includes obtaining a plate of chemical vapor deposition formed diamond. The plate is cut into a plurality of geometrically optimized preforms. The preforms may be finished and cut into diamond gemstones.

US20130223046A1: Method and apparatus for object viewing, observation, inspection, identification and verification

Applicant: -
Publication: 2013-08-29
Filed: 2013-02-19
Status: application

In an object verifier having a housing and an object holder, an object may be placed in the object holder for observation by an operator. The object is illuminated using a collimated beam of white light that is generated by a light generator. The collimated beam of white light is passed through a beam splitter with the two portions of the collimated beam of white light presented to the object at a 90 degree angle one from the other. The interior of the housing includes a reflective surface for maximal illumination of the object. The observer may view the illuminated object through a viewing window and/or through a magnification window. The magnification window provides for the viewing of the object in greater detail.

EP1581676B1: High-speed diamond growth using a microwave plasma in pulsed mode

Applicant: Centre National de la Recherche Scientifique - CNRS, Université Paris XIII, France
Publication: 2013-08-21
Filed: 2003-06-18
Status: PATENT SPECIFICATION

Method for manufacturing a diamond film using a pulsed microwave plasma, in which, in a vacuum chamber, a plasma of finite volume is formed near a substrate by subjecting a gas containing at least hydrogen and carbon to a pulsed discharge, which has a succession of low-power states and high-power states, and having a peak absorbed power Pc, so as to obtain at least carbon-containing radicals in the plasma and to deposit the said carbon-containing radicals on the substrate in order to form a diamond film thereon.

US20130208282A1: Method for positioning and detecting an invisible mark and detector for implementing same

Applicant: -

Publication: 2013-08-15
Filed: 2011-03-18
Status: application

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

CA2765808C: Method for making fancy pale blue or fancy pale blue/green single crystal CVD diamond and product obtained
Applicant: Element Six, United Kingdom
Publication: 2013-07-30
Filed: 2010-06-25
Status: granted

A method of making fancy pale blue or fancy pale blue/green CVD diamond material is described. The method comprises irradiating single crystal diamond material that has been grown by a CVD process with electrons to introduce isolated vacancies into the diamond material, the irradiated diamond material having (or after a further post-irradiation treatment having) a total vacancy concentration [VT] and a path length L such that [VT] x L is at least 0.072 ppm cm and at most 0.36 ppm cm, and the diamond material becomes fancy pale blue or fancy pale blue/green in colour. Fancy pale blue diamonds are also described.

JP2013099428A2: Jewelry
Applicant: K Uno
Publication: 2013-05-23
Filed: 2011-11-08
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a gemstone in which large and small substantially circular shapes such as shapes of flowers and snowmen are clearly made visually recognizable.
Solution: In a gemstone, a flat table is formed in a substantially regular 24-sided polygonal shape substantially forming a circle; multiple ridge lines extending from the circumference of the table to the girdle in the radial direction of the table on planar view, are formed on the circumferential surface of the crown; the areas between the ridge lines and are facet groups configured from multiple micro facets; a small circular facet obtained from a single substantially circular face smaller than the table is formed on the circumferential surface in contact with the table; and in the crown, 24-facet groups are disposed side by side on the circumferential surface, the small circular facet is provided

extending across three or more facet groups, and the portion where the three or more facet groups are deleted, is formed in the shape of the small circular facet.

JP2013052495A2: Polishing machine for polishing diamond material and method of polishing diamond material
Applicant: Sumitomo Electric
Publication: 2013-03-21
Filed: 2011-09-06
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a polishing machine for polishing a diamond material, which can polish the diamond material at high speed with high surface precision.
Solution: In the polishing machine for polishing a diamond material, at least a polishing surface of the polishing machine is formed of diamond particles and a binder. The diamond particles adjacent to each other are connected to each other to form a continuous structure, and the binder is formed of a diamond sintered body including at least one kind of element selected from a group of Ni, Co and Fe, at least one kind of element selected from a group of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo and W, and a carbide of at least one kind of element selected from the group of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo and W.

JP2013034725A2: Diamond cut evaluate program and method
Applicant: Kojima Akira
Publication: 2013-02-21
Filed: 2011-08-09
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a diamond cut evaluate program and a diamond cut evaluate method for outputting an objective reference to a cut evaluation by digitizing and visualizing a cut (shape) being one of four factors when evaluating a diamond as a jewelry.
Solution: The diamond cut evaluate program and the diamond cut evaluate method is constituted by carrying out following steps. (A) a step for three-dimensionally measuring the shape of the diamond and obtaining three-dimensional shape data, (B) a step for restoring the shape from the obtained three-dimensional data and simulating an advancing passage of a light beam by irradiating a simulated light beam to the restored shape, (C) a step for evaluating the right and wrong of the diamond cut based of the simulation of the advancing passage of the simulated light beam, and (D) a step for outputting an evaluation result.

JP2013053038A2: Single crystal diamond and method for producing the same
Applicant: Sumitomo Electric

Publication: 2013-03-21
Filed: 2011-09-02
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide single crystal diamond with its hardness heightened by using a carbon isotope 12C, and to provide a method for producing the same.
Solution: This single crystal diamond is configured of carbon that has a carbon isotope 12C concentration of ≥99.9 mass% and a plurality of unavoidable impurities other than carbon. The unavoidable impurities include nitrogen, boron, hydrogen and nickel; and the total content of nitrogen, boron and hydrogen among the plurality of unavoidable impurities is set to ≤0.01 mass%. In order to produce the single crystal diamond, a hydrocarbon gas having a carbon isotope 12C concentration of ≥99.9 mass% is first subjected to a denitrification treatment. The hydrocarbon gas having been subjected to the denitrification treatment is thermally decomposed on a substrate within a vacuum chamber, for example, at a temperature of ≥1,200°C to ≤2,300°C, thereby preparing a carbon starting material. Diamond is synthesized with use of this carbon starting material, and a seed crystal is cut out of the diamond. This seed crystal is contained in a cell together with a solvent and a carbon source, and single crystal diamond is grown from the seed crystal by a high-temperature high-pressure synthesis method.

JP2013052488A2: Polishing machine for polishing diamond material and method of polishing diamond material
Applicant: Sumitomo Electric
Publication: 2013-03-21
Filed: 2011-09-06
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a polishing machine for a diamond material, which can polish a diamond at high speed with high surface precision.
Solution: In the polishing machine to be used to polish a diamond, a polishing surface of the polishing machine, which abuts on the diamond, is formed of a material including an oxide at 50 vol% or more and having indentation hardness of 500 Kfg/cm2 or more. As the oxide, an oxide of one or more elements selected from a group of Si, Al, Ti, Cr and Zr is desirable.

JP2013047179A2: High temperature/high pressure color change of diamond
Applicant: Element Six Technologies
Publication: 2013-03-07
Filed: 2012-10-10
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a method for changing the color of a brown type IIa diamond from brown to pink.
Solution: The method of changing the color of the brown type IIa diamond from brown to pink includes the steps of: (i) creating a reaction mass by providing the diamond in a pressure transmitting medium which completely encloses the diamond; and (ii) subjecting the reaction mass to a temperature in the range of 1,900 to 2,300°C, under a pressure of 6.9 to 8.5 GPa for a suitable period of time.

JP2013001601A2: Method and apparatus for growing diamond crystal

Applicant: National Institute For Materials Science
Publication: 2013-01-07
Filed: 2011-06-16
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a method and an apparatus for growing a diamond crystal where solid conversion efficiency from a raw material gas to the crystal is enhanced.
Solution: In the method for growing the diamond crystal that the diamond crystal is grown on a substrate from the raw material gas in a reaction chamber by a chemical vapor deposition method, the raw material gas is supplied into the reaction chamber at a raw material gas supplying flow rate G0 satisfied with equation (1): $G0 \leq 10 \times S \times h$ (wherein, S is the area of a substrate; and h is a crystal growing rate) and exhausting from the reaction chamber is performed at an exhausting flow rate G2 satisfied with equation (2): $G2 \leq 0.90 \times G0$. The concentration of the raw material gas is optimized and crystallization efficiency is enhanced by using the method for growing the diamond crystal, the recovery efficiency of the raw material is enhanced by suppressing the exhausting of an unreacted raw material gas and then the solid conversion efficiency from the raw material gas to the diamond crystal can be enhanced.

JP2012250865A2: Method for manufacturing single crystal, and seed crystal fixing agent

Applicant: Sumitomo Electric
Publication: 2012-12-20
Filed: 2011-06-01
Status: published unexamined patent application (based on international application)

Problem to be solved: To provide a method for manufacturing a single crystal, which can grow a high quality single crystal, and to provide a seed crystal fixing agent used in the same.
Solution: The backside of a seed crystal is fixed on a pedestal by using the seed crystal fixing agent. When the backside of the seed crystal is fixed, the seed crystal fixing agent is cured. The seed crystal fixing agent includes a resin becoming a hardly-graphitized

carbon by heating, and a diamond micro particle. A single crystal is grown on the seed crystal fixed on the pedestal.

"State of the art" mailing service

Patent News nr. 113 (11-2013)

WO2013160500A1: Method for improving optical contrast in the production of nanoscale etchings
Applicant: Universidad De Cádiz Spain
Publication: 2013-10-31
Filed: 2013-04-15
Status: application

The invention relates to a method for improving optical contrast in the production of nanoscale etchings. The marking of precious stones and other crystals by nanoetching is very important in jewellery in order to enable the strict control thereof during the distribution, buying and selling thereof. In addition, said technique makes it possible to convert the jewellery into exclusive pieces and/or to add sentimental value by carefully selecting the pattern to be etched onto same. However, given the translucent nature of most precious stones, nanoetchings are not optimised for viewing by optical means. The invention aims to improve the optical contrast of nanoetchings made in precious stones by means of depositing materials into the nanoetching, preferably precious metals. Said improvement is possible since the deposition of an opaque material increases the reflection and absorption of light relative to the translucent stone and/or since depositing nanostructured metals can produce plasmonic effects.

WO2013163671A1: Destiny cut
Applicant: -
Publication: 2013-11-07
Filed: 2012-10-08
Status: application

A gemstone comprising a crown, a pavillion and a girdle. The crown comprising an octagonal table, eight pentangular second half facets and sixteen upper girdle facets. The pavillion comprising four pairs of concentrically arranged cutlet pavillion facets, four pairs of third half facets, four hectgonal lower half facets, four rectangular girdle pavillion facets and four pair of lower girdle break facets. The girdle comprising sixteen facets.

WO2013163670A1: Promise cut diamond and method for cutting the same
Applicant: Jhehd P/Latf The John Hudson Discretionary Trust, Australia

Publication: 2013-11-07
Filed: 2012-09-25
Status: application

A gemstone comprising a crown, a pavillion and a girdle. The crown comprising an octagonal table, eight triangular first half facets, eight second half facets, eight third half facets, and sixteen triangular upper girdle facets. The pavillion comprising four pairs of concentrically arranged cutlet pavillion facets, four pairs of bottom small break facets, eight girdle pavillion facets and eight pairs of bottom half facets. The girdle comprising eight pairs of small girdle half facets and eight full girdle facets.

US20130298605A1: Silicon Carbide Asscher Cut Gemstone
Applicant: -
Publication: 2013-11-14
Filed: 2012-05-08
Status: application

The instant application discloses, among other things, a specific set of cutting proportions tailored for the optical characteristics of Silicon Carbide (“SiC”) Asscher cut gemstone.

US20130291589A1: Silicon Carbide Princess Cut Gemstone
Applicant: -
Publication: 2013-11-07
Filed: 2012-05-03
Status: application

The instant application discloses, among other things, a specific set of cutting proportions tailored for the optical characteristics of Silicon Carbide ("SiC") Princess cut gemstone.

FR2988982A1: Procede d'illumination des pierres taillees a fond reflechissant dans un milieu sombre en presence de rayonnements ultraviolets, et produit issu d'un tel procede
Applicant: Herschon Emmanuel, Admette Marie, France
Publication: 2013-10-11
Filed: 2012-04-04
Status: application

Procédé d'illumination des pierres taillées à fond réfléchissant dans un milieu sombre en présence de rayonnement ultraviolet, et produit issu d'un tel procédé. L'invention concerne un procédé d'illumination des pierres taillées à fond réfléchissant plongées dans un environnement sombre en présence de rayonnement ultraviolet sans nécessiter de circuit électrique et en conservant leur éclat. Le procédé consiste en l'application d'un ou plusieurs revêtements fluorescents sur des parties choisies de la pierre. Le procédé

suivant l'invention est particulièrement destiné à la création d'accessoires de mode pour les boites de nuit, clubs et discothèques.

WO2013156537A1: Synthetic diamond crystals
Applicant: Element Six Limited Ireland, Element Six Abrasives S.A. Luxembourg
Publication: 2013-10-24
Filed: 2013-04-17
Status: application

A method of manufacturing a plurality of synthetic diamond crystals, the method including providing a reaction compact comprising a plurality of diamond seed particles dispersed within a matrix comprising a carbon source and catalyst material; in which the combined surface area of the diamond seed particles is at least 0.01 square cm per cubic cm of the reaction compact volume; the method further including subjecting the reaction compact to an ultra-high pressure and high temperature at which the catalyst material is molten and diamond is more thermodynamically stable than the carbon source, for a sufficient period of time to grow the diamond crystals on the diamond seed particles; and treating the reaction compact to recover the diamond crystals.

WO2013154504A2: Apparatus for the growing diamonds by microwave plasma chemical vapour deposition process and substrate stage used therein
Applicant: IIA Technologies, Singapore
Publication: 2013-10-17
Filed: 2013-04-12
Status: application

An apparatus for growing diamonds, the apparatus comprising: one or more chambers, each chamber is in fluid connection with one or more other chambers, each chamber comprising one or more substrate stage assembly within the chamber to support a substrate stage having a plurality of diamond seeds disposed thereon.

US20130280860A1: Method for synthesizing a material, in particular diamonds, by chemical vapor deposition, as well as device for applying the method
Applicant: -
Publication: 2013-10-24
Filed: 2011-08-01
Status: application

Method for synthesising a material by chemical vapour deposition (CVD), according to which a plasma is created in a vacuum chamber in the vicinity of a substrate, and according to which a carbon-carrying substance and H2 are introduced into the chamber in order to produce in the chamber a gas comprising substances carrying reactive-carbon atoms in the form of unsaturated molecules or radicals from which the synthesis of said

material will be performed, and in that the electromagnetic absorption and inelastic diffusion spectra of the solid material to be synthesised are used to take from these spectra the absorption frequencies that contribute to the reactions that lead to the formation of the solid material to be synthesised, and in that energetic rays are produced in the form of a photon beam carrying quantities of energy determined by each of the frequencies corresponding to said absorption and inelastic diffusion frequencies, said photon beam being injected into the plasma where, for energy states of the solid material, an absorption of these photons having the energy corresponding to these energy states is effected by the substances carrying said reactive-carbon atoms.

US20130272928A1: Apparatus for the deposition of diamonds by microwave plasma chemical vapour deposition process and substrate stage used therein
Applicant: -
Publication: 2013-10-17
Filed: 2012-04-12
Status: application

The present invention is related to an apparatus for the manufacture of gem grade diamonds. The apparatus has a plurality chambers arranged in series to allow gas flow from a first chamber to a last chamber. Each chamber has a substrate stage assembly to support a plurality of diamond seeds, a microwave generator and a microwave source to supply microwave energy into the chamber via a microwave arrangement. A gas supply to supply gases to form the diamonds to the first chamber. The gases supplied to the first chamber are used in sequence with the gases exiting the first chamber becoming the input for a second chamber and then subsequent chambers in series. A vacuum pump is after the final vacuum chamber.

US8574535: Diamond
Applicant: Element Six Limited, Ballasalla, United Kingdom
Publication: 2013-11-05
Filed: 2008-03-07
Status: granted

The present invention relates to an HPHT method for synthesizing single crystal diamond, wherein a single crystal diamond seed having an aspect ratio of at least 1.5 is utilized. Single crystal diamond seeds having an aspect ratio of at least 1.5 and synthetic single crystal diamond which may be obtained by the method recited are also described. The growth surface is substantially aligned along a <100> or <110> direction in the plane of the growth surface.

US8564316: Gem tester
Applicant: Sy Kessler Sales, United States of America
Publication: 2013-10-22

Filed: 2011-06-21
Status: granted

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

US8543469: Systems and methods for improving the liquidity and distribution network for luxury and other illiquid items
Applicant: BGC Partners, United States of America
Publication: 2013-09-24
Filed: 2010-04-14
Status: granted

Systems and methods for improving the liquidity and distribution network for luxury and other illiquid items are provided. These systems and methods preferably include the trading of futures and options contracts, which will provide the liquidity and distribution network for luxury items. Possible embodiments of these systems and methods include the trading of futures and options contracts for diamonds and wine. Another embodiment of this invention preferably includes generating indexes for diamond prices, wine prices, luxury item prices, housing values, mortgage prepayments, privately-held companies or for anything with from sufficiently liquid points of value. Another embodiment of this invention preferably includes a centralized data base for retrieving closing and current auction prices for determining the value of, and best method for the auctioning of various items. The data provided by this data base would improve liquidity by creating greater price transparency.

EP2108054B1: Plasma etching of diamond surfaces
Applicant: Element Six Limited, Isle of Man, United Kingdom
Publication: 2013-10-02
Filed: 2008-01-22
Status: patent specification

A method of producing a single crystal CVD diamond surface including the steps of providing an original single crystal CVD diamond surface, and subjecting the original single crystal CVD diamond surface to inductively-coupled plasma etching (ICP) to remove at least 2 nm of material from the original surface and produce a plasma etched surface,
wherein the gas mixture used in the plasma etching consists of inert gas and chlorine (Cl_2) and said inert gas is argon, helium, neon, krypton, xenon, or a mixture of more than

one of these,
and wherein at least one of the following conditions is satisfied: (i) the roughness Rq of the plasma etched surface at the location of the etched surface where the greatest depth of material has been removed satisfies at least one of the following conditions: a. Rq of the plasma etched surface is less than 1.5 times the roughness of Rq of the original surface, or b. Rq of the plasma etched surface is less than 1 nm, or (ii) the original single crystal CVD diamond surface has been mechanically processed prior to being subjected to the plasma etching and wherein the plasma etched surface is substantially free from residual damage due to mechanical processing.

US8553208: Retail compatible detection of CVD grown diamond
Applicant: SCIO Diamond Technology Corporation, United States of America
Publication: 2013-10-08
Filed: 2012-06-07
Status: granted

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

IL0187010A1: High colour diamond
Applicant: Element Six, United Kingdom
Publication: 2013-09-30
Filed: 2007-10-30
Status: application

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

GB2501808A: Process for manufacturing synthetic single crystal diamond material
Applicant: Element Six
Publication: 2013-11-06
Filed: 2013-03-13
Status: application

A method for manufacturing a plurality of synthetic single crystal diamonds, the method comprises: forming a plurality of seed pads, each seed pad comprising a plurality of single crystal diamond seeds anchored to, or embedded in, an inert holder; loading a carbon source, a metal catalyst, and the plurality of seed pads into a capsule; loading the

capsule into a high pressure high temperature (HPHT) press; and subjecting the capsule to a HPHT growth cycle to grow single crystal diamond material on the plurality of single crystal diamond seeds, the HPHT growth cycle comprising: initiating HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds by increasing pressure and temperature; maintaining HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds via a pressure driven growth process by controlling and maintaining pressure and temperature; and terminating HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds by reducing pressure and temperature, wherein the plurality of single crystal diamond seeds remain anchored to, or embedded in, the inert holders during the HPHT growth cycle. An apparatus for performing the method is also disclosed.

GB2500813A: Press assembly for generating ultra-high pressure
Applicant: Element Six, Ireland
Publication: 2013-10-02
Filed: 2013-03-22
Status: application

A press assembly for pressurising a body, comprises a cartridge for generating a load on the body, a frame comprising a bore for accommodating the cartridge, a chamber for accommodating the body and a fastening mechanism for fastening the cartridge to the frame when the cartridge is inserted into the bore. The bore has an open proximate end into which the cartridge can be inserted and the bore is in communication with the chamber at a distal end. The fastening mechanism is located outside the bore. The fastening mechanism may include a clamping shoulder provided on the cartridge fastened to a flange provided on the frame, by means of a locking ring and a split ring. The press assembly may be suitable for subjecting the body to a pressure of at least about 5GPa.

GB2500812A: A press assembly for use in the formation of synthetic diamond
Applicant: Element Six Abrasives, Luxembourg
Publication: 2013-10-02
Filed: 2013-03-22
Status: application

A press assembly for pressurising a body, comprises a frame and a cartridge for applying load to the body, in which the frame comprises a bore for accommodating the cartridge. The press assembly further comprises an axial securement mechanism for securing the cartridge axially within the bore and a radial securement mechanism for securing the cartridge radially within the bore. The press assembly is configured such that the cartridge can be rotated in the bore between a locked condition and an unlocked condition. The radial and axial securement mechanisms are cooperatively configured with respect to each other so when the cartridge is in the locked condition, both the radial and axial securement mechanisms are engaged and when the cartridge is in the unlocked condition the radial and axial securement mechanisms are both disengaged and there is a

clearance gap between the cartridge and the bore permitting the cartridge to be axially displaceable within the bore. The press assembly may be an ultra-high pressure press assembly suitable for use in the formation of synthetic diamond, cubic boron nitride (cBN), polycrystalline diamond (PCD) and polycrystalline cBN (PCBN). The cartridge may comprise a hydraulic system.

EP2656375A2: A microwave plasma reactor for manufacturing synthetic diamond material
Applicant: Element Six Limited, Ballasalla, United Kingdom
Publication: 2013-10-30
Filed: 2011-12-14
Status: application

EP2656370A2: Microwave plasma reactors and substrates for synthetic diamond manufacture
Applicant: Element Six Limited, Ballasalla, United Kingdom
Publication: 2013-10-30
Filed: 2011-12-14
Status: application

EP2655704A1: Dislocation engineering in single crystal synthetic diamond material
Applicant: Element Six Limited, Ballasalla, United Kingdom
Publication: 2013-10-30
Filed: 2011-12-16
Status: application

JP05296533B2
Applicant: -
Publication: 2013-09-25
Filed: 2006-05-23
Status: published granted patent

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% CH4 per unit of H2 and from about 5 to about 25% O2 per unit of CH4. 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.

JP2012530676A2
Applicant: -
Publication: 2012-12-06
Filed: 2010-06-25
Status: published unexamined patent application

A method of making fancy pale blue or fancy pale blue/green CVD diamond material is described. The method comprises irradiating single crystal diamond material that has been grown by a CVD process with electrons to introduce isolated vacancies into the diamond material, the irradiated diamond material having (or after a further post-irradiation treatment having) a total vacancy concentration [VT] and a path length L such that [VT] x L is at least 0.072 ppm cm and at most 0.36 ppm cm, and the diamond material becomes fancy pale blue or fancy pale blue/green in colour. Fancy pale blue diamonds are also described.

JP2013517631A2
Applicant: -
Publication: 2013-05-16
Filed: 2011-01-14
Status: published unexamined patent application

A single crystal diamond material, when measured at room temperature comprises; a longest linear internal dimension greater than 7 mm, a birefringence of below 1x105determined using a light beam with a cross sectional area greater than 0.01 mm2and along an internal path greater than 7 mm, and an absorption coefficient below 0.010 cm-1determined at a wavelength of 1064 nm. The diamond material may have a concentration of single-substitutional nitrogen in a neutral charge sate of equal to, or less than, 1x1015atoms/cm3. A method of producing the single crystal diamond material comprises chemical vapour deposition (CVD) with multiple growth stages, at least two of the growth stages having different nitrogen concentrations, one of which has a molecular nitrogen concentration of 300 ppb - 5 ppm and the other a molecular nitrogen concentration of 0.001 ppb — 250 ppb. The use of the single crystal diamond material in a Raman laser is also disclosed.

JP2013189373A2
Applicant: -
Publication: 2013-09-26
Filed: 2013-04-24
Status: published unexamined patent application

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

JP05294526B2
Applicant: -
Publication: 2013-09-18
Filed: 2001-04-02
Status: published granted patent

A method is provided for changing the colour of a brown type IIa diamond from brown to colourless. The method involves subjecting the diamond to selected conditions of elevated temperature and elevated pressure to produce the colour change.

JP05294525B2
Applicant: -
Publication: 2013-09-18
Filed: 2001-04-02
Status: published granted patent

A method is provided for changing the colour of a brown type IIa diamond from brown to pink. The method involves subjecting the diamond to selected conditions of elevated temperature and elevated pressure to produce the colour change.

JP2013099428A2: Jewelry
Applicant: Kuno Masahiko
Publication: 2013-05-23
Filed: 2011-11-08
Status: published unexamined patent application

Problem to be solved: To provide a gemstone in which large and small substantially circular shapes such as shapes of flowers and snowmen are clearly made visually recognizable.
Solution: In a gemstone, a flat table is formed in a substantially regular 24-sided polygonal shape substantially forming a circle; multiple ridge lines extending from the circumference of the table to the girdle in the radial direction of the table on planar view, are formed on the circumferential surface of the crown; the areas between the ridge lines and are facet groups configured from multiple microfacets; a small circular facet obtained from a single substantially circular face smaller than the table is formed on the circumferential surface in contact with the table; and in the crown, 24-facet groups are

disposed side by side on the circumferential surface, the small circular facet is provided extending across three or more facet groups, and the portion where the three or more facet groups are deleted, is formed in the shape of the small circular facet.

CA2597176C: Improving the separation of diamond from gangue minerals

Applicant: Mineral And Coal Technologies, United States of America
Publication: 2013-10-22
Filed: 2006-02-03
Status: granted

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

"State of the art" mailing service

Patent News nr. 114 (12-2013)

US20130327090A1: Hearts & Arrows SiC Gemstone
Applicant: -
Publication: 2013-12-12
Filed: 2013-08-14
Status: application

The instant application discloses, among other things, a specific set of cutting proportions tailored for the optical characteristics of Silicon Carbide ("SiC") which may produce a "Hearts & Arrows" reflection pattern.

US20130319045A1: Silicon Carbide Krupps Cut Gemstone
Applicant: -
Publication: 2013-12-05
Filed: 2012-05-29
Status: application

The instant application discloses, among other things, a specific set of cutting proportions tailored for the optical characteristics of Silicon Carbide ("SiC") Krupps cut gemstone.

ES2431440AA: Procedimiento para la mejora del contraste óptico en la elaboración de grabados a nanoescala
Applicant: Univ Cadiz, Spain
Publication: 2013-11-26
Filed: 2012-04-24
Status: application

The invention relates to a method for improving optical contrast in the production of nanoscale etchings. The marking of precious stones and other crystals by nanoetching is very important in jewellery in order to enable the strict control thereof during the distribution, buying and selling thereof. In addition, said technique makes it possible to convert the jewellery into exclusive pieces and/or to add sentimental value by carefully selecting the pattern to be etched onto same. However, given the translucent nature of most precious stones, nanoetchings are not optimised for viewing by optical means. The invention aims to improve the optical contrast of nanoetchings made in precious stones by means of depositing materials into the nanoetching, preferably precious metals. Said

improvement is possible since the deposition of an opaque material increases the reflection and absorption of light relative to the translucent stone and/or since depositing nanostructured metals can produce plasmonic effects.

CN102525050B: Moissanite gem with bright carving surface and cutting and grinding processing methods thereof

Applicant: -
Publication: 2013-11-06
Filed: 2012-01-16
Status: granted

The invention relates to a moissanite gem with bright carving surface and cutting and grinding processing methods of the moissanite gem. For the moissanite gem, the crown angle is 34-35 degrees, the pavilion angle is 41-42 degrees, the table width is 49%-51%, the crown height is 17%-18%, the pavilion depth is 43%-44%, and the total depth is 62%-65%. The methods comprise cutting and grinding angle and proportions of various common bright cutting types of moissanite gems. According to specific properties of crystal axis orientation, refractive index, color, color, transparency and the like of the moissanite gems, after the cutting and grinding angles and proportions are adopted, comprehensive and optimized gloss, flicking and color of the curved-surface moissanite gems are displayed.

US20130330265A1: Plasma Treatment to Strengthen Diamonds

Applicant: -
Publication: 2013-12-12
Filed: 2013-06-11
Status: application

The physical properties of a diamond are altered by: applying a cationic elemental plasma to a diamond at a plasma temperature of less than 300° C.;allowing the cationic plasma to chemically bond with atoms in defects within the diamond; and removing the plasma from the diamond. The cationic elemental plasma may exemplary be selected from the group consisting of as H+, Na+, Li+ K+. It is preferred that no plasma is projected from a source at the diamond and that the plasma is provided as an environment surrounding the diamond.

US20130321792A1: Universal tool for automated gem and mineral identification and measurement

Applicant: -
Publication: 2013-12-05
Filed: 2012-06-04
Status: application

A tool employs Raman spectroscopy, optical imaging, physical measurements, smart software applications, and custom databases for automated on-site gem and mineral identification, measurement, and authenticity verification. Operators with no technical expertise can perform on-site, fast, nondestructive gem and mineral characterization. A custom smart application for data handling and processing enables applicability with a variety of processors. Automated generation of Raman spectral signatures and subsequent correlation to spectral fingerprints of known materials enables gem and mineral identification and verification in field settings. A single tool provides high resolution digital optical imaging and physical measurement capabilities, enables comprehensive sample characterization and reporting that currently requires multiple tools and significant labor. The Tool also provides the capability for sample analysis, requiring an additional level of technical expertise, to be done remotely at another location by the transmission of the data via a communications link. A rechargeable battery pack is included.

US8593620: Device for measuring properties of scatterers , for color measuring for scattered light of gemstones, for measuring brightness of gemstones, and for measuring luminescence distribution

Applicant: Ninomiya Jewelr, Japan
Publication: 2013-11-26
Filed: 2011-05-10
Status: granted

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

RU12116155A

Applicant:
Publication: 2013-10-27
Filed: 2010-09-22
Status: application

A diamond sorting system comprising a diamond source for supplying one or more diamonds to be graded by a vision system having one or more cameras arranged to take one or more images of the diamond, and a processor arranged to receive the image data

and execute an algorithm on the data to grade the diamond. The sorting system further comprising a diamond collection unit arranged to receive a graded diamond from the vision system and an electromechanical diamond transporter arranged to transport a diamond to be graded from the diamond source to the vision system, and further arranged to transport a graded diamond from the vision system to the diamond collection unit.

WO2013177463A1: Engraved gemstone viewer for personal communications devices

Applicant: Gemex Systems, United States of America
Publication: 2013-11-28
Filed: 2013-05-23
Status: application

A gemstone viewer for personal communications devices for viewing a surface of a gemstone that has been micro or nano etched, engraved or embossed with an image or inscription such as an identification number. The viewer is mounted to employ the camera and LED light source of the personal communications device. The viewer directs the light from the light source as a light beam along a path incident to the surface of the gemstone containing the inscription. The gemstone spectrally reflects the light beam along a path back toward and through a magnifying lens to the camera lens of the personal communications device thereby enhancing the magnifying properties of the camera lens to produce a viewable light image that reveals the inscription on the viewing screen of the personal communications device.

KR2013114994A: Apparatus for chemical vapor deposition for diamond film and method for synthesis of diamond film

Applicant: Korea Inst Sci & Tech, Republic of Korea
Publication: 2013-10-21
Filed: 2012-04-10
Status: application

The present disclosure relates to a chemical vapor deposition apparatus for synthesizing a diamond film and a method for synthesizing a diamond film using the same, which maintains the substrate temperature at an optimum level by suppressing the rise of a substrate temperature, and, thus, improves the degree of activation of a diamond synthesizing gas to increase a diamond growth rate when synthesizing a diamond film. The chemical vapor deposition apparatus for synthesizing a diamond film according to the present disclosure includes a chamber in which a chemical vapor deposition process is performed, a substrate provided in the chamber and giving a place where diamond is grown, and a heat-shielding structure spaced above from the substrate, wherein the heat-shielding structure includes an opening through which a precursor gas is transferable.

GB2502434A: Synthetic diamond crystals and a method of synthesis

Applicant: Element Six, Ireland; Element Six Abrasives Sa, Luxembourg
Publication: 2013-11-27
Filed: 2013-04-17
Status: application

A method of manufacturing a plurality of synthetic diamond crystals, the method including providing a reaction compact comprising a plurality of diamond seed particles dispersed within a matrix comprising a carbon source and catalyst material; in which the combined surface area of the diamond seed particles is at least 0.01 square cm per cubic cm of the reaction compact volume; the method further including subjecting the reaction compact to an ultra-high pressure and high temperature at which the catalyst material is molten and diamond is more thermodynamically stable than the carbon source, for a sufficient period of time to grow the diamond crystals on the diamond seed particles; and treating the reaction compact to recover the diamond crystals. The carbon source may be graphite powder. The catalyst may comprise iron, nickel, cobalt, or manganese, or mixtures thereof. Also claimed is a plurality of diamond crystals made by the process as defined above.

JP05320536B2
Applicant: Kojima Akira
Publication: 2013-10-23
Filed: 2011-08-09
Status: granted

problem to be solved: To provide a diamond cut evaluate program and a diamond cut evaluate method for outputting an objective reference to a cut evaluation by digitizing and visualizing a cut (shape) being one of four factors when evaluating a diamond as a jewelry.
solution: The diamond cut evaluate program and the diamond cut evaluate method is constituted by carrying out following steps. (A) a step for three-dimensionally measuring the shape of the diamond and obtaining three-dimensional shape data, (B) a step for restoring the shape from the obtained three-dimensional data and simulating an advancing passage of a light beam by irradiating a simulated light beam to the restored shape, (C) a step for evaluating the right and wrong of the diamond cut based of the simulation of the advancing passage of the simulated light beam, and (D) a step for outputting an evaluation result.

JP2013514958A2
Applicant: -
Publication: 2013-05-02
Filed: 2010-12-15
Status: application

A method of producing a grown single crystal diamond substrate comprises: providing a first diamond substrate which presents a (001) major surface, bounded by at least one < 100 > edge, the length of the said at least one <100> edge exceeding any dimension of the surface that is orthogonal to the said at least one < 100 > edge by a ratio of at least 1.3 : 1; and growing diamond material homoepitaxially on the (001) major surface of the diamond material surface under chemical vapour deposition (CVD) synthesis conditions, the diamond material growing both normal to, and laterally from the major (001) surface. The growth of the diamond material may be carried out in one or more steps until the lateral growth of the diamond material has achieved full effective rotation of the (001) major surface. Diamond material grown by this method is also disclosed.

JP2013514959A2
Applicant: -
Publication: 2013-05-02
Filed: 2010-12-15
Status: published unexamined patent application (based on international application)

A method for synthesizing diamond materials by chemical vapour deposition (CVD) comprises: providing a substrate, providing a source gas and allowing homoepitaxial diamond synthesis on the substrate. The environment in which synthesis takes place comprises nitrogen at an atomic concentration of between 0.4-50 ppm and the source gas comprises; an atomic fraction of hydrogen, Hf, of 0.4-0.75, an atomic fraction of carbon, Cf, of 0.15-0.3 and an atomic fraction of oxygen, Of, of 0.13-0.4, wherein Hf+ Cf+ Of=1 and the ration of the atomic fractions of carbon and oxygen is 0.45:1 < Cf:Of < 1.25:1 and the hydrogen atoms present in the source gas are added as H2at an atomic fraction of the total number of hydrogen, oxygen and carbon atoms present of 0.05-0.4, wherein Hf, Cf, and Ofare fractions of the total number of hydrogen, oxygen and carbon atoms present in the gas source. Diamond material made by this method and its use as a gemstone or as part of an electronic device is also disclosed.

USD695147: Multiple facet gemstone
Applicant: Rosy Blue, Inc., United States of America
Publication: 2013-12-10
Filed: 2013-04-16
Status: granted

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

JP05324556B2
Applicant: -
Publication: 2013-10-23
Filed: 2010-12-27

Status: granted

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

GB1316322A0: Single crystal chemical vapour deposited synthetic diamond materials having uniform colour

Applicant: Element Six
Publication: 2013-10-30
Filed: 2013-09-13
Status: application
