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Patent News nr. 70 (01-2010)



US20090308104A1: Gemstone cut

Applicant: -
Publication: 2009-12-17
Filed: 2009-06-16
Status: application

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

WO2009154577A1: Method for growing monocrystalline diamonds

Applicant: Nozomi Technotron, Indian Institute of Technology Bombay, India
Publication: 2009-12-23
Filed: 2009-06-18
Status: application

A method of forming mono-crystalline diamond by chemical vapour deposition, the method comprising the steps of: (a) providing at least one diamond seed; (b) exposing the seed to conditions for growing diamond by chemical vapour deposition, including supplying reaction gases that include a carbon-containing gas and hydrogen for growing diamond and include a nitrogen-containing gas; and (c) controlling the quantity of nitrogen-containing gas relative to other gases in the reaction gases such that diamond is caused to grow by step-growth with defect free steps without inclusions. The nitrogen is present in the range of 0.0001 to 0.02 vol %. Diborane can also be present in a range of from 0.00002 to 0.002 vol %. The carbon-containing gas can be methane.

US20090319336A1: Diamond valuation method, apparatus and computer readable medium product

Applicant: Rosy Blue DMCC, Dubai, United Arab Emirates
Publication: 2009-12-24
Filed: 2007-07-30
Status: application

Further it is an object of the present invention to provide a method for evaluating a diamond comprising the steps of selecting a diamond to value, determining the shape, size, color, clarity and cut of the selected diamond, determining a base price of the selected diamond, calculating the applicable discounts/premium for the parameters of the selected diamond, calculating a weightage for each parameter of the selected diamond for which a discount/premium is calculated, calculating a total adjusted price based on the discount/premium determined, the weightage determined and the base price determined in step d, and outputting the calculated total adjusted price. Further it is an object of the present invention to provide a method for determining the discounts/premium applicable to each parameter for a diamond—by selecting records of a given shape, size, color, clarity and cut—where the corresponding parameters are equal or within a specified small range, with the exception of parameter i and then determining the average sales price Y for a diamond for the ideal value V(0) of the selected parameter i, determining an average price Y(i) for a diamond with the selected parameter value of V(i), calculating a discount/premium D(i) of the selected diamond using the formula $D(i)=(Y-Y(i))/Y$, and repeating for each additional parameter V(i) determined. Further, the discount/premium with respect to the base/standard/index diamond, D'(i) is calculated as $D'(i)=[D(i)-D(I)]/[1-D(I)]$ where D(I) is the discount/premium of the base/standard/index diamond. Further it is an object of the present invention to provide a method for determining the weightage for each parameter of the selected diamond by regression analysis for each parameter i.

US20090297429A1: High growth rate methods of producing high-quality diamonds

Applicant: -
Publication: 2009-12-03
Filed: 2006-12-15
Status: application

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

US7628856: Method for producing substrate for single crystal diamond growth

Applicant: Shin-Etsu Chemical, Japan; AGD Material, Japan
Publication: 2009-12-08
Filed: 2007-03-02

Status: granted

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

US7622151: Method of plasma enhanced chemical vapor deposition of diamond using methanol-based solutions

Applicant: Auburn University, United States of America
Publication: 2009-11-24
Filed: 2004-02-05
Status: granted

Briefly described, methods of forming diamond are described. A representative method, among others, includes: providing a substrate in a reaction chamber in a non-magnetic-field microwave plasma system; introducing, in the absence of a gas stream, a liquid precursor substantially free of water and containing methanol and at least one carbon and oxygen containing compound having a carbon to oxygen ratio greater than one, into an inlet of the reaction chamber; vaporizing the liquid precursor; and subjecting the vaporized precursor, in the absence of a carrier gas and in the absence in a reactive gas, to a plasma under conditions effective to disassociate the vaporized precursor and promote diamond growth on the substrate in a pressure range from about 70 to 130 Torr.

EP1444390B1: Apparatus and method for diamond production

Applicant: Carnegie Institution of Washington; The UAB Research Foundation, United States of America
Publication: 2009-12-30
Filed: 2002-11-07
Status: granted

An apparatus for producing diamond in a deposition chamber, comprising: (i) a heat-sinking holder for holding a diamond and for making thermal contact with a side surface of the diamond adjacent to an edge of a growth surface of the diamond; (ii) a thermal mass for receiving thermal energy from the heat-sinking holder, wherein the diamond is retained in said heat-sinking holder by pressure applied through the thermal mass; (iii) a stage for receiving thermal energy from the heat-sinking holder via the thermal mass; (iv) means for regulating the heat transfer between said diamond, thermal mass and stage and, optionally, other parameters, such as height between diamond growth surface and heat-sinking holder, plasma power, coolant flow rate and temperature, or gas flow rate;

(v) either (a) a noncontact temperature measurement device positioned to monitor the temperature gradient between a single edge or corner point with respect to the middle of the growth surface, indicative of the maximum temperature gradient that exists across the growth surface of the diamond; or (b) a plurality of non-contact temperature measurement devices positioned to monitor the temperature at a plurality of locations on the diamond's surface; and (vi) a main process controller programmed to determine, in the case of (v)(a) the maximum temperature gradient that exists across the growth surface of the diamond or, in the case of (v)(b) programmed to integrate overlapping fields of view from multiple pyrometers to produce a contiguous "map" of the temperatures across the diamond's growth surface; and further programmed to control the temperature of the growth surface such that all temperature gradients across the growth surface are less than 20°C.

EP1890799B1: Method for growing synthetic diamonds

Applicant: MMI Trust Holding, Luxembourg
Publication: 2009-11-25
Filed: 2006-05-30
Status: granted

Growth of synthetic diamonds used as gemstones comprises subjecting carbonaceous material comprising polycrystalline nanodiamond particles to high-pressure and high-temperature treatment

WO2009114130A3: Process and apparatus for diamond synthesis

Applicant: Michigan State University United States of America; Fraunhofer USA
Publication: 2009-12-30
Filed: 2009-03-10
Status: later publication of ISR with revised front page

The present invention relates to a microwave plasma deposition process and apparatus for producing diamond, preferably as single crystal diamond (SCD). The process and apparatus enables the production of multiple layers of the diamond by the use of an extending device to increase the length and the volume of a recess in a holder containing a SCD substrate as layers of diamond are deposited. The diamond is used for abrasives, cutting tools, gems, electronic substrates, heat sinks, electrochemical electrodes, windows for high power radiation and electron beams, and detectors.

ES2273815T5: Cambio de color de un diamante mediante alta temperatura/alta presion.

Applicant: Element Six Technologies
Publication: 2009-12-07
Filed: 2001-04-02
Status: translation of modified European patent

Changing the color of brown type IIa diamond from brown to pink involves creating reaction mass by providing diamond in pressure transmitting medium, and subjecting the reaction mass to specified temperature and pressure

ES2273824T5: Cambio de color de un diamante mediante alta temperatura/alta presión.

Applicant: Element Six Technologies
Publication: 2009-12-02
Filed: 2001-04-02
Status: translation of modified European patent

Changing of grey type IIb diamond from grey to blue or enhancing the color of type IIb diamond by creating reaction mass, and subjecting the reaction mass to specified temperature and pressure

EP2125188A2: Large single crystal diamonds

Applicant: Element Six Technologies
Publication: 2009-12-02
Filed: 2008-03-07
Status: application

Single crystal diamond synthesis used, e.g. as cutting tool, by mounting single crystal diamond seed on substrate, and effecting crystal growth in high pressure high temperature environment

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Patent News nr. 71 (02-2010)



US20100000507A1: Angle cut on CVD diamond

Applicant: Apollo Diamond Gemstone Corporation, United States of America
Publication: 2010-01-07
Filed: 2009-05-08
Status: application

A cut gemstone has one or more backside grooves cut into backside facets to form sub facets that operate to increase the brilliance of the cut gemstone.

EP2144526A2: Heart shaped diamond cut having hearts and arrows pattern

Applicant: Worldwide Diamond Trademarks, Canada
Publication: 2010-01-20
Filed: 2008-04-22
Status: application

Heart shaped diamond has main pavilion facets that are aligned at fixed angle, comprise symmetrical pavilion half facets so that main facets meets at point corresponding to symmetrical center of diamond, girdle and table facet

WO2010003600A1: Process and system for fabrication of patterns on a surface

Applicant: The Provost, Fellows and Scholars of the College of the Holy and Undivided Trinity of Queen Elizabeth Near Dublin
Publication: 2010-01-14
Filed: 2009-07-03
Status: application

The invention provides a system and process of patterning structures on a carbon based surface comprising exposing part of the surface to an ion flux, such that material properties of the exposed surface are modified to provide a hard mask effect on the surface. A further step of etching unexposed parts of the surface forms the structures on the surface. The inventors have discovered that by controlling the ion exposure, alteration of the surface structure at the top surface provides a mask pattern, without substantially removing any material from the exposed surface. The mask allows for subsequent ion etching of unexposed areas of the surface leaving the exposed areas raised relative to the

unexposed areas thus manufacturing patterns onto the surface. For example, a Ga⁺ focussed ion beam exposes a pattern onto a diamond surface which produces such a pattern after its exposure to a plasma etch. The invention is particularly suitable for patterning of clear well-defined structures down to nano-scale dimensions.

US20100017258A1: Establishing standardized diamond profiles and pricing

Applicant: -
Publication: 2010-01-21
Filed: 2008-07-15
Status: application

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

US20100015438A1: High colour diamond layer

Applicant: -
Publication: 2010-01-21
Filed: 2006-06-22
Status: application

A method of producing 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.

US20100012022A1: Diamond uses/applications based on single-crystal cvd diamond produced at rapid growth rate

Applicant: -
Publication: 2010-01-21
Filed: 2009-09-14
Status: application

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

US20100010752A1: System and method for gemstone cut grading

Applicant: GIA

Publication: 2010-01-14
Filed: 2009-07-13
Status: application

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

US20100010751A1: System and method for gemstone cut grading

Applicant: GIA
Publication: 2010-01-14
Filed: 2009-06-30
Status: application

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

US7652755: Apparatus and method for color measurement and color grading of diamonds, gemstones and the like

Applicant: -
Publication: 2010-01-26
Filed: 2007-02-23
Status: granted

The present invention discloses an apparatus that comprises a spectrometer, and computer and a dual integrating sphere measurement arrangement comprising a measurement integrating sphere, a sample integrating sphere, a sample platform, a filter, a lens system, a baffle and a light source. The sample integrating sphere encloses a sample to provide a constant environment for simulating the visual color grading environment. The computer controls the spectrometer and provides measurement parameters calculated from physical parameters of the measured sample, including, but not limited to, shape, dimensions,

refractive index, intensity of fluorescence and cut grade. The computer then calculates spectral reflectance and colorimetric data, and determines an average color grade by checking a look-up-table that represents the relationship between the CIELAB coordinate and the average color grade. The computer also determines a true color grade based upon the average color grade and the physical parameters, using mathematical analytic algorithms.

JP2009196832A2: Method for manufacturing single crystal diamond by plasma cvd process

Applicant: National Institute of Advanced Industrial & Technology
Publication: 2009-09-03
Filed: 2008-02-20
Status: application

Problem to be solved: To synthesize good quality single crystal diamond at a high growth rate by suppressing an increase in substrate temperature even in the manufacture of single crystal diamond by a plasma CVD process under high pressure exceeding about 80 Torr.
Solution: A method for manufacturing a single crystal diamond by a plasma CVD process in which the pressure in a synthesis chamber is not lower than 80 Torr is disclosed, wherein a raw material gas with helium added thereto is used.

WO2010010352A1: Diamond material

Applicant: Element Six Limited, United Kingdom
Publication: 2010-01-28
Filed: 2009-07-22
Status: application

Single crystal diamond having a high chemical purity i.e. a low nitrogen content and a high isotopic purity i.e. a low ¹³C content, methods for producing the same and a solid state system comprising such single crystal diamond are described.

DE60123591T3: Hochtemperatur/hochdruck-farbeveränderng von diamanten

Applicant: Element Six Technologies, South Africa
Publication: 2010-01-07
Filed: 2001-04-02
Status: translation of EP patent after opposition

Changing the color of brown type IIa diamond from brown to pink involves creating reaction mass by providing diamond in pressure transmitting medium, and subjecting the reaction mass to specified temperature and pressure

HK1082278A1: Optical quality diamond material

Applicant: Element Six, United Kingdom
Publication: 2009-12-31
Filed: 2006-04-11
Status: application

Chemical vapor deposition single crystal diamond material for optical device of element,
has high surface polish, high flatness, and high parallelism.

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Patent News nr. 72 (03-2010)



WO2010010375A1: Gemstone viewer

Applicant: De Beers UK Limited, United Kingdom
Smith, James, Gordon, Charters United Kingdom
Publication: 2010-01-28
Filed: 2009-07-16
Status: application

An apparatus for viewing images of a gemstone is described. The apparatus comprises a support structure for supporting the gemstone at an observation position. An illumination structure comprises a plurality of directional light sources directed towards the observation position so as to illuminate the gemstone. The support structure and illumination structure are relatively rotatable relative to one another about a rotation axis. An imaging device is arranged to obtain images of the gemstone at the observation position at a variety of relative rotational positions between the illumination structure and support structure: the imaging device has an imaging axis passing through the observation position. The support structure is arranged so that the gemstone can be placed at the observation position in such a way that the normal to a selected facet of the gemstone is within a range of tilt angles from the rotation axis. The arrangement of directional light sources is such that, for any tilt angle within the range, at least one of the directional light sources will be specularly reflected from the selected facet into the imaging device for at least one rotational position of the support structure.

US20100047519A1: Plasma etching of diamond surfaces

Applicant: -
Publication: 2010-02-25
Filed: 2008-01-22
Status: application

The present invention relates to a method of producing a diamond surface including the steps of providing an original diamond surface, subjecting the original diamond surface to plasma etching to remove at least 2 nm of material from the original surface and produce a plasma etched surface, the roughness R_q of the plasma etched surface at the location of the etched surface where the greatest depth of material has been removed satisfying at least one of the following conditions: R_q of the plasma etched surface is less than 1.5 times the roughness of R_q of the original surface, or R_q of the plasma etched

surface is less than 1 nm.

US20100028556A1: Chemical vapor deposition colored diamond

Applicant: Apollo Diamond Gemstone Corporation, United States of America
Publication: 2010-02-04
Filed: 2009-05-08
Status: application

Chemical vapor deposition grown diamonds may be provided with one or more layers of doping to form colored diamonds. In one embodiment, layers of pink colored diamond may be formed by doping with nitrogen. In further embodiments, layers of yellow colored diamond may be formed by doping with boron. In some embodiments, the grown diamond has a single crystalline structure with minimal to no grain boundaries.

US20100028246A1: Synthesis of diamond

Applicant: Element Six Ltd South Africa
Publication: 2010-02-04
Filed: 2004-12-09
Status: application

In a method of synthesising diamond, a reaction mixture of a carbon source and a solvent/catalyst is pretreated at a high temperature and a high vacuum to remove substantially all of the atmospheric gases and other light volatile atoms. Then, at a reduced temperature, the removed gas is replaced with a desirable process gas. The pretreated reaction mixture is then subjected to elevated temperature and pressure conditions in the diamond stable region of the carbon phase diagram in the presence of the process gas to produce the diamond. The process gas is selected to enhance the diamond growth rate, reduce solvent/catalyst inclusions, shift the morphology of the synthesised diamond (grown crystals) towards major crystal faces and blocker shape, reduce cracking and strain in the grown crystals, preferably at a desirably high growth rate, and permit the controlled and uniform doping of the diamond crystal with a hetero-atom such as P (phosphorus) or S (sulphur).

US7655882: Microinscribed gemstone

Applicant: Lazare Kaplan International, United States of America
Publication: 2010-02-02
Filed: 2006-03-14
Status: granted

An apparatus and method for producing an authentication certification for a gemstone, having a processor, a database coupled to the processor, in which are stored data defining laser micro-inscriptions and physical characteristics of a plurality of gemstones, a graphic user interface (GUI) for interacting with and controlling the processor, and a computer

output device, presenting in human readable form, information from the database describing for a respective gemstone the laser micro-inscription and physical characteristic information. The output is suitable for authentication of a presumptive gemstone. A corresponding method generates data for the database from the gemstone, and/or authenticates a laser-microinscribed gemstone based on previously stored data.

JP04387406B2: Oval cut diamond

Applicant: -
Publication: 2009-12-16
Filed: 2005-03-25
Status: granted

Oval cut diamond comprises star facets formed on sides of girdle formed with crown and pavilion main facets arranged opposing to each other

JP04387405B2: Oval cut diamond

Applicant: -
Publication: 2009-12-16
Filed: 2005-03-25
Status: granted

Diamond has pair of pavilion main facets arranged opposite to each other with respect to central axis, which have crown main facet pair respectively facing them across girdle

JP04386640B2:

Applicant: Gersan Establishment
Publication: 2009-12-16
Filed: 2002-02-18
Status: granted

Formation of mark on gemstone or industrial diamond involves projecting mask image into the gemstone or diamond, and projecting a setting-up radiation different from exposure radiation to form setting-up image

JP2009209027A2: Improved chemical-vapor-deposited diamond

Applicant: Nanocarbon Research Institute; Japan Vilene
Publication: 2009-09-17
Filed: 2008-02-29
Status: application

Problem to be solved: To provide a method for manufacturing high quality and homogeneous chemical-vapor-deposited (CVD) diamond at an economical speed.

Solution: An aqueous colloid is prepared by bead milling an agglutinated body of single-digit nanodiamond particles, and after bringing the colloid into a flaky state by removing water, a colloid in a non-aqueous dispersion medium of the single-digit nanodiamond particles is produced by again dispersing the nanodiamond particles in the flaky state into the non-aqueous dispersion medium. The colloid in the non-aqueous dispersion medium of the single-digit nanodiamond particles is applied, as a seed, on a substrate by using a patterning device utilizing an inkjet printing principle so that the density of the nanodiamond particles becomes 2×10^{11} pieces/cm² or higher. Thereafter, the non-aqueous dispersion medium is removed by a vacuum heating drying method or microwave irradiation, and a diamond film is produced on the substrate by a CVD method by using the single-digit nanodiamond particles as seed.

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Patent News nr. 73 (04-2010)



WO2010033099A1: Decagonal shaped diamond which displays hearts and arrows pattern

Applicant: Sundiamond USA, United States of America
Publication: 2010-03-25
Filed: 2008-09-16
Status: application

A decagonal 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. The decagonal shaped diamond should be cut to form ten main crown facets of substantially equal size symmetrically arranged relative to one another surrounding a table facet twenty star facets with two star facets polished on every main crown facet, ten main pavilion facets, an equal number of crown half facets as pavilion half facets and ten main girdle facets with the girdle facets polished at a given angle relative to one another for forming the decagonal shape of the diamond.

DE102008046972A1: Facettiert geschliffener Edelstein, insbesondere Diamant

Applicant: Bürger, Helmut; Germany
Publication: 2010-03-18
Filed: 2008-09-12
Status: application

Facettiert geschliffener Edelstein, insbesondere Diamant, aufweisend mindestens eine Tafel 100, vier erste Unterteilfacetten 10, acht zweite Unterteilfacetten 20 und acht dritte Unterteilfacetten 30, wobei die ersten Unterteilfacetten 10 mit der Tafel 100 jeweils erste Unterteilfacettenwinkel im Bereich von 45 bis 60° bilden, wobei die zweiten Unterteilfacetten 20 mit der Tafel 100 jeweils zweite Unterteilfacettenwinkel zwischen 45 bis 60° bilden, wobei die dritten Unterteilfacetten 30 mit der Tafel dritte Unterteilfacettenwinkel im Bereich von 40 bis 55° bilden, wobei die acht zweiten Unterteilfacetten 20 und die acht dritten Unterteilfacetten 30 gegenüber den vier ersten Unterteilfacetten 10 um eine gedachte Drehachse 101 senkrecht zur Tafel 100 gedreht sind, wobei erste Drehwinkel W1 zwischen einer ersten und einer zweiten Unterteilfacette 10, 20 im Bereich von 2 bis 28° sowie zweite Drehwinkel W2 zwischen einer ersten und einer dritten Unterteilfacette 10, 30 im Bereich von 10 bis 38° ausgebildet sind. Der Edelstein weist beim Blick durch die Tafel ein vierstrahliges

Reflexbild in Form eines "Malteserkreuzes" auf. Der Schliff ist Material-sparend in Bezug auf natürlich vorkommende Diamantoktaeder.

US20100088348A1: Method and system for providing a clarity grade for a gem

Applicant: -
Publication: 2010-04-08
Filed: 2008-10-07
Status: application

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.

US20100086179A1: Automated system and method for clarity measurements and clarity grading

Applicant: -
Publication: 2010-04-08
Filed: 2008-10-07
Status: application

A computer-based system and method for taking clarity measurements of a gem, and a computer-readable medium having computer-executable instructions, are provided and include receiving a pixilated image of a gem and identifying pixels representing an inclusion. The method and medium further include determining characteristics of the inclusion as a function of the pixels representing the inclusion, and providing a clarity grade based upon the determined characteristics. Also provided is a method for mapping a gem, and a computer-readable medium having computer-executable instructions, which include receiving a pixilated image of a gem having facet edges, and identifying pixels representing the facet edges. The method and medium further include generating a diagram of the gem, such that the diagram is a function of the pixels representing the facet edges, and superimposing the diagram onto the pixilated image.

US20100085635A1: Reflected dark field method and apparatus

Applicant: -

Publication: 2010-04-08
Filed: 2008-10-07
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.

US20100068122A1: Gem growth cubic press and associated methods

Applicant: -
Publication: 2010-03-18
Filed: 2009-08-13
Status: application

A multiple anvil press can be configured for gem-quality growth. The press can include a plurality of opposing anvils, where the anvils are configured for simultaneous movement within a tolerance of less than about 0.5 mm as measured at each anvil surface, and each anvil can be aligned to a common center of all the anvils where the alignment is tuned to a tolerance of less than about 0.1 mm during use. The press can also include a reaction volume formed by the enclosure of all anvils, where the reaction volume has a size configured to facilitate single crystal growth per cycle time.

US20100055022A1: Diamond identifier

Applicant: Apollo Diamond Gemstone Corporation, United States of America
Publication: 2010-03-04
Filed: 2009-05-08
Status: application

Diamonds are embedded with one or more layers representative of an identifier. The identifier may include encoding in the form of defects created in one or more layers in a recognizable pattern, such as a bar code, characters or symbols. In some embodiments, a single crystal CVD diamond is formed with layers of varying thickness to provide the encoding. A system includes a radiation source to provide short wavelength light. A holder positions 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, and a

pattern identifier correlates a detected pattern of defects to unique identification information.

US20100053597A1: Detection of chemical vapor deposition grown diamond

Applicant: Apollo Diamond Gemstone Corporation, United States of America
Publication: 2010-03-04
Filed: 2009-05-08
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.

USRE41189: Method of making enhanced CVD diamond

Applicant: Carnegie Institution of Washington, United States of America
Publication: 2010-04-06
Filed: 2009-01-30
Status: reissue

Single crystal CVD diamond is heated to temperatures of 1500° C. to 2900° C. under a pressure that prevents significant graphitization. The result is a CVD diamond with improved optical properties.

US20100059034A1: Gemstone production from cvd diamond plate

Applicant: Apollo Diamond Gemstone Corporation, United States of America
Publication: 2010-03-11
Filed: 2009-05-08
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.

US7695159: Apparatus and method for illuminating articles of jewelry

Applicant: -
Publication: 2010-04-13
Filed: 2005-11-25
Status: granted

A lighting apparatus for illuminating display items, and particularly articles of jewelry including gemstones such as diamonds, located within a display area. The apparatus includes a plurality of substantially white light sources arranged such that each light source is spaced apart from adjacent light sources of the apparatus. Light absorbing material is disposed so as to substantially occupy the spaces between adjacent sources when viewed from within the display area. Accordingly, light is emitted into the display area as a plurality of bright regions interspersed with one or more regions of darkness. The lighting apparatus is particularly effective in producing desirable and visually perceptible effects, such as fire and scintillation, within a gemstone. Furthermore, the invention enables the desirable visually perceptible effects to be produced in a more pleasing fashion and/or with lower power consumption and heat generation than is the case with comparable prior art lighting arrangements. Methods of using the lighting apparatus for viewing items of jewelry are also provided.

US7677954: O.D. centerless grinding machine

Applicant: -
Publication: 2010-03-16
Filed: 2007-05-21
Status: granted

In one aspect of the present invention, an outer diameter (O.D.) centerless grinding machine for use in grinding a diamond workpiece has a grinding wheel positioned parallel to a regulating wheel which is adapted to press a cylindrical workpiece into the grinding wheel as the regulating wheel rotates. Electronic equipment may be adapted to adjust a pressure of the regulating wheel against the grinding wheel. Also, a carrier may be adapted to house the workpiece, the carrier being attached to a translation mechanism adapted to move the carrier between the wheels such that the workpiece is in contact with both wheels.

US20100092067A1: Gem pattern matching algorithm to determine the percentage match of a target gem pattern to a database of gem patterns

Applicant: Collectors Universe, Inc.
Publication: 2010-04-15
Filed: 2008-10-14
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.

JP2009285733A2: Diamond or gemstone marking

Applicant: Gersan Establishment
Publication: 2009-12-10
Filed: 2009-08-20
Status: application

Problem to be solved: To provide a method and an apparatus for forming a mark on the surface of a diamond or other gemstones.

Solution: A method and an apparatus are disclosed for forming a mark on the surface of a diamond or gemstone. The mark consists of a plurality of grooves which do not detrimentally affect the clarity grade of the diamond or gemstone, and which exhibit a highly diffractive effect under specified illumination and magnification conditions. An apparatus and a method for observing such a mark are also described.

JP04387405B2:

Applicant: -
Publication: 2009-12-16
Filed: 2005-03-25
Status: application

Diamond has pair of pavilion main facets arranged opposite to each other with respect to central axis, which have crown main facet pair respectively facing them across girdle

JP04386640B2:

Applicant: -
Publication: 2009-12-16
Filed: 2002-02-18
Status: granted

Formation of mark on gemstone or industrial diamond involves projecting mask image into the gemstone or diamond, and projecting a setting-up radiation different from exposure radiation to form setting-up image

JP04382359B2:

Applicant: -
Publication: 2009-12-09
Filed: 2002-01-18
Status: granted

Mixed cut gemstone e.g. diamond has crown and stepped pavilion arranged above and below girdle plane respectively

JP2009298682A2: Diamond

Applicant: Sasagawa Dai

Publication: 2009-12-24

Filed: 2008-06-16

Status: application

Problem to be solved: To provide a method for producing 1 carat diamond from cubic carbon.

Solution: A diamond of 1 carat is obtained by heating 0.3g cubic of graphite immediately upto 2,000°C and holding for 10 min in atmospheric pressure.

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Patent News nr. 74 (05-2010)



EP2179672A1: A cut diamond

Applicant: Tolkowsky, Jean-Paul Meijer, Belgium
Publication: 2010-04-28
Filed: 2008-10-22
Status: application

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

EP1855556A4: ethod and system for laser marking in the volume of gemstones such as diamonds

Applicant: Barron Wes, Bourliaguet Bruno, Levesque Marc, Cournoyer Alain, Cantin Daniel, Champagne Yves
Publication: 2010-04-14
Filed: 2005-08-26
Status: application

Controlling a formation of indicia in bulk of gemstone specimen e.g. diamond, by monitoring the creation of indicia while executing a protocol, and interrupting further execution of protocol when indicia exhibits characterizing features

CA2442584C: Forming a mark on a gemstone or industrial diamond

Applicant: Gersan, Liechtenstein
Publication: 2010-04-06
Filed: 2002-02-18

Status: granted

To form a micro mark on the table of a diamond, a holder or dop with the diamond is spun, a photo resist is applied to the table, the resist is baked by heating the base of the dop, and the dop is transferred to the table of apparatus for exposing the resist. The resist is exposed using an exposure radiation with a pattern which is a reduced image of a mask, working through an objective lens. The exposure radiation is projected by a radiation source and can be 350 to 450 nm. In order to locate, orientate and focus the image, the radiation source is arranged to project light in the wavelength range 500 to 550 nm, which does not affect the resist, forming a setting-up image on the table. the setting-up image is viewed in an observation plane through the objective lens and a beam splitter. After exposure, the resist is developed and the exposed area of the table is then milled using a plasma.

CN21426448Y:

Applicant: -
Publication: 2010-03-24
Filed: 2009-06-15
Status: granted patent for utility model

Round crystal diamond, has crown slant surfaces provided with two scale surfaces with different sizes, where lower side of slant surfaces is connected with waist part and upper side of slant surfaces is connected with crown table surface

WO2010009467A3: Method for producing nanocrystalline diamond coatings on gemstones and other substrates

Applicant: -
Publication: 2010-04-29
Filed: 2009-07-20
Status: application

A method to apply nano-crystalline diamond onto a selected substrate, including preparing Nanodiamond slurry of nanodiamond particles dispersed in a medium. The medium may include a liquid or a sol-gel. The selected substrate is immersed in the Nanodiamond slurry for a predetermined period of time. Then the substrate is removed from the slurry. The substrate is then dried with a flow of inert gas. The substrate is left coated with a coating of the nanodiamond particles that are highly adherently held by van der Waals forces.

WO2010048607A2: Enhanced optical properties of chemical vapor deposited single crystal diamond by low-pressure/high-temperature annealing

Applicant: Carnegie Institution Of Washington
Publication: 2010-04-29

Filed: 2009-10-26
Status: application

The method of improving the optical properties of single crystal CVD diamond which comprises annealing the crystals at a temperature of up to 2200°C and a pressure below 300 torr.

WO2010048349A1: Gemstone positioning fixture

Applicant: Gemex Systems
Publication: 2010-04-29
Filed: 2009-10-21
Status: application

A gemstone positioning fixture, including a base and a cover plate applied over the base. The cover plate has apertures, one for each gem to be worked on. At least one biasing member is positioned beneath the plate. The biasing member applies an upward force to the gems to contact the cover plate. The plate is formed of materials that conduct electricity, so as to conduct any charged particles away from the gem work surface.

US20100104494A1: Enhanced optical properties of chemical vapor deposited single crystal diamond by low-pressure/high-temperature annealing

Applicant: -
Publication: 2010-04-29
Filed: 2009-10-26
Status: application

The method of improving the optical properties of single crystal CVD diamond which comprises annealing the crystals at a temperature of up to 2200° C. and a pressure below 300 torr.

US20100102039A1: Gemstone positioning fixture

Applicant: Gemex Systems
Publication: 2010-04-29
Filed: 2009-10-21
Status: reissue

A gemstone positioning fixture, including a base and a cover plate applied over the base. The cover plate has apertures, one for each gem to be worked on. At least one biasing member is positioned beneath the plate. The biasing member applies an upward force to the gems to contact the cover plate. The plate is formed of materials that conduct electricity, so as to conduct any charged particles away from the gem work surface.

US20100100460A1: Diamond retailer, wholesaler and consumer finder, tracker and sales system

Applicant: -
Publication: 2010-04-22
Filed: 2009-12-23
Status: application

An information processing system for electronically vertically integrating a consumer, retailer and wholesaler of diamonds (or jewelry) includes maintaining a diamond inventory database which lists common characteristics, wholesale price and retail price. In the retail facility or space, the consumer electronically searches the diamond database and is presented with record displays of diamonds within the scope of the search and the retail price. A retailer's computer can mimic the consumer search and display the wholesale price. This tracking and a sales alarm trigger facilitates a face-to-face sale of the diamond. An alarm issues when the consumer's search exceeds certain predetermined parameters.

WO2010040180A1: Modified apparatus and method for assessment, evaluation and grading of gemstones

Applicant: Opal Producers Australia Limited, Australia
Publication: 2010-04-15
Filed: 2009-10-09
Status: application

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

US20100111354A1: Apparatus and methods for assessment, evaluation and grading of gemstones

Applicant: Opal Producers Australia Limited, Australia
Publication: 2010-05-06
Filed: 2008-04-02
Status: application

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 analysing the images, with the information processing means being programmed with an instruction set for colour calibrating the images and then analysing the colour calibrated images by segmentation and histogram measurement.

JP2010001215A2: Single crystal diamond

Applicant: Element Six Ltd
Publication: 2010-01-07
Filed: 2009-10-07
Status: application

Problem to be solved: To provide a method of producing a large area plate of single crystal diamond from diamond grown on a substrate substantially free of surface defects by chemical vapor deposition, in which the diamond homoepitaxially grown by chemical vapor deposition and the substrate are severed transverse to the surface of the substrate on which diamond growth took place to produce the large area plate of single crystal CVD diamond.

Solution: A (001) single crystal CVD diamond plate has major surfaces on opposite sides thereof bounded by {100} side surfaces, wherein each major surface has at least one linear dimension exceeding 10 mm.

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Patent News nr. 75 (06-2010)



US20100126406A1: Production of single crystal cvd diamond at rapid growth rate

Applicant: -
Publication: 2010-05-27
Filed: 2009-11-24
Status: application

In a method of producing diamonds by microwave plasma-assisted chemical vapor deposition which comprises providing a substrate and establishing a microwave plasma ball in an atmosphere comprising hydrogen, a carbon source and oxygen at a pressure and temperature sufficient to cause the deposition of diamond on said substrate, the improvement wherein the diamond is deposited under a pressure greater than 400 torr at a growth rate of at least 200 $\mu\text{m/hr}$. from an atmosphere which is either essentially free of nitrogen or includes a small amount of nitrogen.

US20100123098A1: Ultratough single crystal boron-doped diamond

Applicant: -
Publication: 2010-05-20
Filed: 2009-05-05
Status: application

Single-crystal boron-doped diamond grown by microwave plasma chemical vapor deposition, useful e.g. as optical windows in harsh environments, laser optics, transparent shielding and micro-electro-mechanical system devices. The invention relates to a single crystal boron doped CVD diamond that has a toughness of at least about 22 MPa $\text{m}^{1/2}$. The invention further relates to a method of manufacturing single crystal boron doped CVD diamond. The growth rate of the diamond can be from about 20-100 $\mu\text{m/h}$.

US20100119790A1: Diamond

Applicant: -
Publication: 2010-05-13
Filed: 2008-03-07
Status: application

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 utilised. 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.

US20100116197A1: Optical quality diamond material

Applicant: -
Publication: 2010-03-24
Filed: 2009-06-15
Status: application

A CVD single crystal diamond material suitable for use in, or as, an optical device or element. It is suitable for use in a wide range of optical applications such as, for example, optical windows, laser windows, optical reflectors, optical refractors and gratings, and etalons. The CVD diamond material is produced by a CVD method in the presence of a controlled low level of nitrogen to control the development of crystal defects and thus achieve a diamond material having key characteristics for optical applications.

US20100111812A1: Single crystalline diamond and producing method thereof

Applicant: Sumitomo Electric Industries, Japan
Publication: 2010-05-06
Filed: 2010-01-08
Status: application

The object of the present invention is to obtain a high quality single crystalline diamond that has less distortion and large area suitable for semiconductor device substrates or an optical component material. The present invention is a single crystalline diamond produced by chemical vapor deposition, wherein, when a linear polarized light which is composed of two linear polarized lights perpendicular to each other is introduced into one main face of the single crystalline diamond, a maximum value of a retardation between the two linear polarized lights perpendicular to each other which come out from an opposite main face is not more than $50 \frac{1}{4}\mu\text{m}$ at maximum per a thickness of $100 \frac{1}{4}\mu\text{m}$ across an entire of the single crystalline diamond, and also a method for producing the diamond.

US7729949: Systems and methods for improving the liquidity and distribution network for luxury and other illiquid items

Applicant: BGC Partners, United States of America
Publication: 2010-06-01
Filed: 2007-02-05
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.

US7713507: Tough diamonds and method of making thereof

Applicant: Carnegie Institution of Washington, United States of America
Publication: 2010-05-11
Filed: 2006-11-21
Status: granted

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

EP2189555A2: System and method for producing synthetic diamond

Applicant: Apollo Diamond, Inc., United States of America
Publication: 2010-05-26
Filed: 2001-08-08
Status: application

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

EP2186649A1: Method for marking valuable articles

Applicant: Nizienko, Yuri Konstantinovich, Russian Federation

Publication: 2010-05-19
Filed: 2007-07-27
Status: application

The invention relates to methods of marking valuable items, mainly precious stones and In particular, cut diamonds, and can be used for their identification. To implement the marking procedure, the identification surface of the product is first polished. A marking image, optically visible in reflected light is formed on the polished surface by modifying the identification area of said surface by means of a guided ion beam with a given ion energy. In the modification process, the composition of the surface layer is modified with the possibility of changing the optical properties of modified sites in relation to the optical properties of untreated sites of the identification surface. The modification of the identification surface is carried out by a pulse ion beam through a stencil mask, resulting in implantation of modifier ions into the crystal lattice of the marking area of the surface layer without damaging the covalent bonds between the atoms of the lattice and, accordingly, without damage to the original topography of this layer. Said changes in the optical properties of the marking area are provided through the use as a modifier of such material, the ions of which alter the complex refractive index of the base material upon implantation into its crystal lattice as doping additives

WO2010062419A2: Diamond bodies grown on sic substrates and associated methods

Applicant: -
Publication: 2010-06-03
Filed: 2009-08-03
Status: application

The present invention provides methods of forming high quality diamond bodies under high pressure, and the diamond bodies produced by such methods. In one aspect, a method is provided for growing a diamond body, including providing a non-particulate silicon carbide (SiC) mass having a pre-designed shape, placing the SiC mass under high pressure in association with a molten catalyst and a carbon source, and maintaining the SiC mass under high pressure to form a substantially monocrystalline diamond body. The diamond body may be formed across substantially all of the SiC mass having surface area exposed to the molten catalyst. As such, the diamond body may conform to the shape of the exposed surface area of the SiC mass.

WO2010040180A1: Modified apparatus and method for assessment, evaluation and grading of gemstones

Applicant: Opal Producers Australia
Publication: 2010-04-15
Filed: 2009-10-09
Status: application

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

US20100111354A1: Apparatus and methods for assessment, evaluation and grading of gemstones

Applicant: Opal Producers, Australia
Publication: 2010-05-06
Filed: 2008-04-02
Status: application

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 analysing the images, with the information processing means being programmed with an instruction set for colour calibrating the images and then analysing the colour calibrated images by segmentation and histogram measurement.

WO2009045445C2: Low pressure method annealing diamonds

Applicant: Carnegie Inst of Washington, United States of America
Publication: 2010-05-14
Filed: 2008-10-02
Status: re-issued granted

The present invention relates to method of improving the optical properties of diamond at low pressures and more specifically to a method of producing a CVD diamond of a desired optical quality which includes growing CVD diamond and raising the temperature of the CVD diamond from about 1400 °C to about 2200 °C at a pressure of from about 1 to about 760 torr outside the diamond stability field in a reducing

atmosphere for a time period of from about 5 seconds to about 3 hours.

WO2009045445A9: Low pressure method annealing diamonds

Applicant: Carnegie Inst of Washington, United States of America
Publication: 2010-05-14
Filed: 2008-10-02
Status: complete corrected document or international application or ISR
republished with corrections

The present invention relates to method of improving the optical properties of diamond at low pressures and more specifically to a method of producing a CVD diamond of a desired optical quality which includes growing CVD diamond and raising the temperature of the CVD diamond from about 1400 °C to about 2200 °C at a pressure of from about 1 to about 760 torr outside the diamond stability field in a reducing atmosphere for a time period of from about 5 seconds to about 3 hours.

JP2010013322A2: Method for removing surface damage of single-crystal diamond

Applicant: National Institute of Advanced Industrial & Technology
Publication: 2010-01-21
Filed: 2008-07-04
Status: application

Problem to be solved: To provide a novel method effective for removing surface damage of a single-crystal diamond substrate, and a manufacturing method of a single-crystal diamond through a CVD method using the single-crystal diamond from which the surface damage has been removed as a substrate.

Solution: The method for removing surface damage of the single-crystal diamond comprises steps of: implanting ions into the single-crystal diamond to form a non-diamond layer near a surface of the diamond; graphitizing the non-diamond layer; and removing a surface layer by etching. The resulting single-crystal diamond achieves substantially complete removal of surface defects caused by cutting, polishing, etc. without increasing surface roughness thereof, and is substantially free of dislocations intersecting the surface thereof. Thus, by growing a diamond by the CVD method using the thereby processed single-crystal diamond as a substrate, propagation of dislocations or formation of new dislocations can be markedly prevented, thereby significantly improving crystallinity of the resulting single-crystal diamond.

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Patent News nr. 76 (07-2010)



News

A proposal on translation arrangements for a future EU Patent, the final element needed for a single EU Patent to become a reality, has been presented today by the European Commission. Today, obtaining a patent in Europe costs ten times more than one in the US. This situation discourages research, development and innovation, and undermines Europe's competitiveness. That is why Europe needs to act so that innovators can protect their inventions at an affordable cost with a single patent covering the entire EU territory with minimum translation costs and without needing to validate that patent at a national level as they currently have to do. The new proposal builds on the successful three language system at the European Patent Office (EPO) and, if adopted, would drastically reduce existing translation costs.

US20100154473A1: Round brilliant cut diamond and its incision method

Applicant: Shenzhen Zhenchengmei Jewelry Co
Publication: 2010-06-24
Filed: 2010-02-26
Status: application

The present invention discloses a round brilliant cut diamond. The diamond includes a crown, a girdle, and a pavilion, the cut crown includes one regular octagon table, eight first facets, eight second facets, and sixteen third facets, wherein the cut pavilion has sixteen quadrangular fourth facets, sixteen quadrangular fifth facets, and sixteen sub-triangular sixth facets. The sixteen fourth facets meet at a point, which forms an apex, and each fourth facet, fifth facet and sixth facet meet a point. A depth of the fourth facets is smaller than 21.6% of the total girdle diameter. The present invention also discloses methods for preparing above mentioned round brilliant-cut diamond.

WO2010068419A2: Production of single crystal cvd diamond rapid growth rate

Applicant: Carnegie Institution Of Washington, United States of America
Publication: 2010-06-17
Filed: 2009-11-24
Status: application

In a method of producing diamonds by microwave plasma-assisted chemical vapor deposition which comprises providing a substrate and establishing a microwave plasma ball in an atmosphere comprising hydrogen, a carbon source and oxygen at a pressure and temperature sufficient to cause the deposition of diamond on said substrate, the improvement wherein the diamond is deposited under a pressure greater than 400 torr at a growth rate of at least 200 $\mu\text{m/hr}$. from an atmosphere which is either essentially free of nitrogen or includes a small amount of nitrogen.

WO2010063041A1: Diamond-based commodities trading system

Applicant: -
Publication: 2010-06-03
Filed: 2009-11-20
Status: application

This invention relates to a tradeable commodity, a trading system for a plurality of such commodities and a method of trading using such a system. As a rule, diamonds are not readily fungible. This invention proposes means to combine individually non-uniform, non-standard, relatively non-fungible valuable items, such as diamonds, into a largely standardised, fungible tradeable commodity as well as a trading system for a plurality of such commodities and a method of trading using such a system.

US20100166636A1: Large diamond crystal substrates and methods for producing the same

Applicant: National Institute of Advanced Industrial Science and Technology, Japan
Publication: 2010-07-01
Filed: 2009-12-23
Status: application

The present invention provides a method for producing a large substrate of single-crystal diamond, including the steps of preparing a plurality of single-crystal diamond layers separated from an identical parent substrate, placing the single-crystal diamond layers in a mosaic pattern on a flat support, and growing a single-crystal diamond by a vapor-phase synthesis method on faces of the single-crystal diamond layers where they have been separated from the parent substrate.
According to the method of the invention, a mosaic single-crystal diamond having a large area and good quality can be produced relatively easily.

US20100166635A1: Interrupted Diamond Growth

Applicant: -
Publication: 2010-07-01
Filed: 2009-12-11
Status: application

A method for growing diamonds under high pressure high temperature (HPHT) is provided. In one aspect, such a method can include providing a growth precursor including a carbon source and a catalyst material, the growth precursor having a diamond precursor particle arranged at least partially therein, melting the diamond precursor particle, and growing a diamond particle by subjecting the melted diamond precursor particle and the growth precursor to temperature and pressure conditions sufficient for diamond growth. In some aspects, the resulting diamond particle can be utilized as a diamond precursor particle in a subsequent reaction to grow an even larger diamond particle.

US7740824: Optical quality diamond material

Applicant: -
Publication: 2010-06-22
Filed: 2003-11-21
Status: granted

A CVD single crystal diamond material suitable for use in, or as, an optical device or element. It is suitable for use in a wide range of optical applications such as, for example, optical windows, laser windows, optical reflectors, optical refractors and gratings, and etalons. The CVD diamond material is produced by a CVD method in the presence of a controlled low level of nitrogen to control the development of crystal defects and thus achieve a diamond material having key characteristics for optical applications.

US7736435: Method of producing single crystal

Applicant: National Institute of Advanced Industrial Science and Technology, Japan
Publication: 2010-06-15
Filed: 2005-11-16
Status: granted

A method for producing a single crystals by preferential epitaxial growth of {100} face, comprising the steps of (1) growing the crystal on a single crystal {100} substrate; (2) forming on the side of the grown crystal a surface parallel to a {100} face different from the {100}face in the growth direction, and (3) growing the crystal on the formed {100} surface; and the steps (2) and (3) being performed once or more than once. A method for producing a single-crystal diamond using a metallic holder for the single-crystal diamond having a crystal holding portion which is raised above an outer peripheral portion of the holder, is part from the outer peripheral portion of the holder, and has a recessed shape. The methods enable the production of a large single-crystal diamond in a comparatively short time at low cost.

US7751034: Systems and methods for ray tracing

Applicant: American Gem Society, United States of America
Publication: 2010-07-06

Filed: 2006-11-28
Status: granted

Systems and methods for evaluating an optical property of a gemstone operate to trace selected and ordered model light rays through a model of the gemstone. The rays may be selected such that, when ordered into a sequence, the points of contact of successive rays with the gemstone surface generate a pattern defined by a path created by the linking of successive contact points with line segments. Further, the rays may be propagated through the gemstone in a manner that utilizes an ordered set of facet identifiers corresponding to facets impinged upon by a ray previously propagated through the gemstone. Moreover, these strategies can be combined by propagating an ordered sequence of rays corresponding to an ordered set of contact points generating a pattern defined by a path, and using for such propagation an ordered set of facet identifiers corresponding to facets impinged upon by a ray previously propagated through the gemstone.

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Patent News nr. 77 (08-2010)



WO2010078265A2: Method of cutting diamonds

Applicant: -
Publication: 2010-07-08
Filed: 2009-12-28
Status: application

In a method of taking a star facet of a diamond and extending its length to the girdle (the outside perimeter) of the diamond, a shield style (obelisk-shaped) facet is produced in rounds and fancy cut diamonds, and on square and off squares it remains a three-sided facet but is made larger and longer. The facet becomes larger than it was previously. It becomes a five-sided facet when it was a three before (or a much larger three-sided facet on squares and off squares). The reason it becomes five-sided is because when the facet is extended it collides with the bezel and both upper girdle facets as it extends to the girdle on rounds and fancy cut diamonds. The new facet on square and off square becomes longer and larger but remains three-sided. When the new star facet of rounds, fancy, square and off square diamonds collide with the others it produces a new larger facet and makes an exchange of positions of the previous largest facet which is true of all rounds, fancy, square and off square. This new facet has a different angle from the previous largest facet. Because of the adjustment it appears a little different because the world is used to the standard cuts. The new cut produces new angles for the largest facet and produces a very appealing display of light performance.

AT69500050A1: Körper zum handhaben von schmucksteinen

Applicant: Swarovski & Co, Austria
Publication: 2010-07-15
Filed: 2008-12-19
Status: application

Suction valve for use in compressor, has unloader arranged with central section on lock sleeve for guidance and anti rotation of unloader, and cylinder shaped lock sleeve provided with base area with non-circular outer contour

AT0011233U1: Verfahren zur herstellung einer schmucksteinanordnung

Applicant: Swarovski & Co, Austria
Publication: 2010-07-15

Filed: 2009-07-28
Status: Utility model with search report

WO2010082029A1: High pressure high temperature (hpht) method for the production of single crystal diamonds

Applicant: Element Six Limited, United Kingdom
Publication: 2010-07-22
Filed: 2010-01-15
Status: application

A high pressure high temperature (HPHT) method for synthesizing single crystal diamond, wherein a single crystal diamond seed having an aspect ratio of at least (1) and a growth surface substantially parallel to a {110} crystallographic plane is utilised is described. The growth is effected at a temperature in the range from 1280°C to 1390°C.

US20100178730A1: Direct-current plasma CVD apparatus and method for producing diamond using the same

Applicant: Shin-Etsu Chemical, Ltd., Tokyo, Japan
Publication: 2010-07-15
Filed: 2010-01-04
Status: application

The present invention is a direct-current plasma CVD apparatus comprising at least a fixed electrode and a substrate stage having a top flat face and combined with an electrode for placing a substrate, in which the substrate stage top face is not located on a line extended from a center of the fixed electrode in vertical direction, and an angle formed between a line of a length R connecting a center of the substrate stage top face with the center of the fixed electrode and the line extended in vertical direction from the center of the fixed electrode is 90° or less. As a result, there is provided a direct-current plasma CVD apparatus in which a high quality vapor phase growth film, such as diamond of a large area having few defects caused by the fall of the substances produced at the fixed electrode, can be obtained.

US20100178233A1: Synthetic diamonds prepared from organic materials

Applicant: -
Publication: 2010-07-15
Filed: 2004-04-14
Status: application

The present invention relates to a method of making a more permanent remembrance from a graphitizable or carbon-containing material, wherein the material is part of or embodied in an ephemeral object that signifies a power, attribute, memory, custom,

tradition, emotion or symbolism associated with a life experience or event. The method includes transforming the ephemeral object to the more permanent remembrance by converting the carbon-containing material to a synthetic diamond, thus transferring the power, attribute, memory, custom, tradition, emotion or symbolism of the object or the associated life experience or event into the diamond. The synthetic diamond can be prepared by transforming the carbon-containing material to a carbon compound or carbon-containing compound; and then converting the carbon compound or carbon-containing compound into the synthetic diamond.

US7754180: Ultrahard diamonds and method of making thereof

Applicant: Carnegie Institution of Washington, United States of America
Publication: 2010-07-13
Filed: 2007-11-07
Status: granted

A single crystal diamond grown by microwave plasma chemical vapor deposition annealed at pressures in excess of 4.0 GPa and heated to temperature in excess of 1500 degrees C. that has a hardness of greater than 120 GPa. A method for manufacture a hard single crystal diamond includes growing a single crystal diamond and annealing the single crystal diamond at pressures in excess of 4.0 GPa and a temperature in excess of 1500 degrees C. to have a hardness in excess of 120 GPa.

WO2010075428A1: Engraved gemstone viewer

Applicant: Gemex Systems, United States of America
Publication: 2010-07-01
Filed: 2009-12-22
Status: application

The present invention is an engraved gemstone viewer for viewing a smooth surface of a gemstone that has been micro or nano etched, engraved or embossed with an inscription such as an identification number. The gemstone is mounted on a piece of jewelry or can remain unmounted when received by the viewer. A source of light directs a light beam toward a magnifying lens coated with a reflection enhancing coating. The lens reflects the light beam along a path incident to the surface of the gemstone containing the inscription. The smooth gemstone surface specularly reflects the light beam along a path back toward the magnifying lens, which produces a viewable light image that reveals the inscription. The inscription is shown as a combination of darkened or lightened areas, lines and characters given the reduction or absence of light reflected, or highlighted by the reflection of light.

WO2010062419A3: Diamond bodies grown on sic substrates and associated methods

Applicant: -

Publication: 2010-07-29
Filed: 2009-08-03
Status: later publication of isr with revised front page

The present invention provides methods of forming high quality diamond bodies under high pressure, and the diamond bodies produced by such methods. In one aspect, a method is provided for growing a diamond body, including providing a non-particulate silicon carbide (SiC) mass having a pre-designed shape, placing the SiC mass under high pressure in association with a molten catalyst and a carbon source, and maintaining the SiC mass under high pressure to form a substantially monocrystalline diamond body. The diamond body may be formed across substantially all of the SiC mass having surface area exposed to the molten catalyst. As such, the diamond body may conform to the shape of the exposed surface area of the SiC mass.

US7755072: System and method for three-dimensional location of inclusions in a gemstone

Applicant: -
Publication: 2010-07-13
Filed: 2004-09-21
Status: granted

The present invention presents a non-destructive method and means of obtaining either the inner portion or the outer contour of a two-dimensional or three-dimensional model of the outer contours of a gemstone. The method comprising the steps of placing the gemstone on a holder such that the gemstone to be scanned is located in a radiation path comprising inter alia at least one emitter and at least one detector synchronized by a processor; radiating said gemstone by means of said emitter; detecting the emitted irradiation by means of said detector; processing said detection such that a two-dimensional in-scan of said gemstone is obtained by means of said processor; displacing the gemstone in respect to said emitter and said detector; repeating steps (b) through (e) for a plurality of predetermined displacements; and, if a three-dimensional model is required, integrating the obtained multiple two-dimensional in-scans into a three-dimensional model of the gemstone's outer contours; wherein the emitter is an irradiation delivery device, selected from a group consisting of either monochromatic or white light, UV or IR emitters; X-ray radiation source and/or collimator of the same; NMR, CT, NQR and/or MIR scatters; beta radiation emission devices; gamma radiation emission devices; laser beam cannons; photons cannons; microwave or RF emitters; sonic or ultrasonic emitters or any combination thereof.

JP04469552B2

Applicant: -
Publication: 2010-05-26
Filed: 2001-06-14
Status: granted

High quality single crystal chemical vapor deposition diamond layer used for manufacturing chemical vapor deposition diamond used as gemstones and diamond anvils, has predetermined thickness.

JP04440272B2

Applicant: -
Publication: 2010-03-24
Filed: 2004-12-10
Status: granted

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

JP04410243B2

Applicant: -
Publication: 2010-02-03
Filed: 2004-02-25
Status: granted

Incorporation of human or animal material into gemstone, i.e. diamond, by creating ashes from human or animal material, and filling internal passageway within gemstone with mixture of ashes, lead or lead compound, and chloride.

JP2010064909A2: Method for processing surface layer of diamond

Applicant: National Institute of Advanced Industrial Science & Technology
Publication: 2010-03-25
Filed: 2008-09-09
Status: application

Problem to be solved: To provide a method capable of forming a processed part having excellent flatness by a relatively simple method in a method for processing the surface layer of diamond capable of processing the surface of the diamond into an arbitrary shape.

Solution: The method for processing the surface layer of the diamond includes processes of (1) to (3): (1) A process for forming a shielding layer having a shape corresponding to the projecting part of the objective diamond processing surface on the surface of the diamond to be treated. (2) A process for forming a graphitized non-diamond layer in the vicinity of the surface of the diamond by performing ion implantation from the surface of the diamond wherein the shielding layer is formed at the (1) process and heating the diamond. (3) A process for separating the surface layer part from the non-diamond layer

by etching the graphitized non-diamond layer.

JP2010058204A2: Lapping device for single-crystalline diamond

Applicant: -
Publication: 2010-03-18
Filed: 2008-09-02
Status: application

Problem to be solved: To grind a {110} plane or the like of a single-crystalline diamond with high grinding efficiency while a load of an operator is reduced and experience is not needed.

Solution: Since a holder is rotatably provided around a spindle core, the holder is automatically rotated around the spindle core irrespective of an attachment posture of the single-crystalline diamond on the holder. Therefore, a rigid layer located like a layer on the {110} plane of the diamond 10 is approximately parallel to a lapping direction A, so that the posture of the mono-crystalline diamond is automatically adjusted to attain the highest grinding efficiency. Thus, the mono-crystalline diamond can be lapped with high grinding efficiency by reducing a load of an operator and without need of experience while a troublesome operation of controlling the attachment posture of the diamond with respect to the lapping direction A is not needed.

JP2010058203A2: Lapping device for single-crystalline diamond

Applicant: OSG Corp
Publication: 2010-03-18
Filed: 2008-09-02
Status: application

Problem to be solved: To grind a {110} plane or the like of a single-crystalline diamond with high dimensional accuracy while a load of an operator is reduced and experience is not needed.

Solution: The displacement X of the single-crystalline diamond approaching a lapping machine in grinding is detected by a displacement sensor. Since the grinding of the diamond is automatically stopped when the displacement X reaches a preset target value target X, the diamond is constantly ground by the preset target value target X with high accuracy irrespective of a variation in grinding direction or grinding speed caused by individual differences. In addition, an operator needs to merely put the single-crystalline diamond on a holder, input the target value target X by a target value input key and turn on a grinding start switch. Thus, the load of the operator can be largely reduced, and a grinding time can be shortened to improve operation efficiency.

IL0168588A1: Apparatus and article for polishing gemstones

Applicant: Sarin Polishing Technologies, Israel; Noam Gleicher
Publication: 2010-06-30
Filed: 2005-05-15

Status: application

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mailing service**

Patent News nr. 78 (09-2010)



EP2211656A2: Gemstones and methods for controlling the appearance thereof

Applicant: California Inst of Techn, United States of America
Publication: 2010-08-04
Filed: 2008-11-28
Status: application published without search report

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

CA2606197C: Method and system for laser marking in the volume of gemstones such as diamonds

Applicant: Internat Gemstone Registry Inc, Canada
Publication: 2010-08-10
Filed: 2005-08-26
Status: granted

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

WO2010081557A1: Production method for encapsulating at least one three-dimensional object in a body, and body produced by means thereof

Applicant: Montblanc-Simplo GmbH, Germany
Publication: 2010-07-22
Filed: 2009-01-16
Status: application

The invention relates to a production method for encapsulating at least one three-dimensional object in a body, comprising the steps of providing the body, introducing a recess for the object to be encapsulated in the body, introducing the object in the recess, and applying a transparent layer to the body. The object is thereby completely encapsulated under a closed outer surface free of bubbles. If the object is a ground precious gem, the body can be significantly optically enhanced without degrading the usefulness thereof or exposing the precious gem to detrimental external influences.

WO2010092537A1: Process for coating diamond with refractory metal carbide and methal

Applicant: Element Six (Production), South Africa
Publication: 2010-08-19
Filed: 2010-02-11
Status: application

The invention relates to method of depositing refractory metal carbide onto part of a surface of a body comprising diamond, the method including adhering directly onto part of the surface a refractory precursor material comprising a compound including oxygen and at least one metal selected from the group consisting of Ti, V, Cr, Zr, Nb, Mo, Hf, Ta and W; the refractory precursor material being reducible in the presence of carbon on the application of heat to form at least one compound comprising metal carbide or mixed metal carbide; and reducing the refractory precursor material by the application of heat. The invention further relates to a body comprising diamond, part of the surface of the body having directly adhered thereto a metal carbide and part of the surface of the body having directly adhered thereto a metallic material and the content of diamond being greater than 80 volume percent of a volume of the body.

US20100220310A1: Fast UV-VIS-NIR absorption spectrometer system and method

Applicant: -
Publication: 2010-09-02
Filed: 2009-02-27
Status: application

A method and system for evaluating a colored gem stone which has been cooled to below a designated temperature are provided. The system includes a cooling unit configured to support and cool a gem stone to below a desired temperature, an electromagnetic

radiation source, a spectrometer, an integrating sphere, and a processing unit. The method includes receiving a spectral response of the colored gem stone and sampling a noise component within a range of wavelengths in the spectral response so as to make a baseline determination. The method further includes ascertaining a presence of at least one designated peak within the range of wavelengths as a function of the baseline determination, and evaluating the presence of each of the at least one designated peaks so as to provide an indication of whether the colored gem stone requires further evaluation.

US20100218722A1: High velocity method for depositing diamond films from a gaseous phase in SHF discharge plasma and a plasma reactor for carrying out said method

Applicant: Institute of Applied Physics RAS, Russian Federation
Publication: 2010-09-02
Filed: 2010-02-26
Status: application

The invention relates to carbon deposition by decomposing gaseous compounds with the aid of the SHF discharge plasma and can be used, for example, for producing polycrystalline diamond films (plates), which are used for producing output windows of power SHF sources, for example gyrotrons. Said invention ensures a high speed deposition of the high quality diamond films (having a loss-tangent angle equal to or less than 3×10^{-5} on supports whose diameter is equal to or higher than 100 mm. For this purpose, a SHF discharge is initiated in a gas mixture which is arranged in a reaction chamber and contains at least hydrogen and hydrocarbon. Afterwards, said gas mixture is activated by producing a stable nonequilibrium plasma with the aid of SHF radiation having a frequency f which is many times higher than a commonly used frequency of 2.45 GHz, for example 30 GHz. In order to localize the plasma, a standing wave is formed near the carrier and plasma layers are formed in the antinodes thereof in such a way that the sizes thereof are adjustable.

US7776408: Method and apparatus for producing single crystalline diamonds

Applicant: -
Publication: 2010-08-17
Filed: 2007-02-14
Status: granted

A method and an apparatus for producing one or more single crystalline diamonds. One or more diamond seeds are placed in a substrate holder in a chemical vapor deposition (CVD) chamber. One or more metal discs are then positioned in the chemical vapor deposition chamber such that high temperature is generated at low microwave power. A diamond forming gas is then provided adjacent to the one or more diamond seeds. Plasma is then generated from the diamond forming gas by exposing the diamond forming gas to microwave radiation. The one or more diamond seeds are then exposed to the plasma under certain conditions to form single crystalline diamonds. The position of the plasma

is manipulated to provide uniform growth conditions at the growth surface of the one or more diamond seeds.

EP2216126A2: Laser marking system for gemstones and method of authenticating marking

Applicant: Lazare Kaplan International Inc., United States of America
Publication: 2010-08-11
Filed: 1996-11-14
Status: application published without search report

A laser microinscribing system includes a Q-switched Nd: YLF laser (1) with a harmonic converter producing an output of about 530 nm, an optical system including a focussing lens, a gemstone mounting holder that is displaceable along three axes for moving a workpiece such as a gemstone with respect to the optical system so that laser energy is presented to desired positions, an imaging system for viewing the gemstone from a plurality of viewpoints including a top CCD and a side CCD, a processor controlling the position of the holder based on marking instructions and a predetermined program, and a storage system for storing information relating to images of a plurality of workpieces. A rigid frame supports the laser, the optical system and the holder to increase immunity to vibrational misalignments. A secure certificate of authenticity of a market workpiece is preferably provided having an image of the marking as well as the outline of a girdle of the gemstone.

US20100220311A1: Method and apparatus for rapidly cooling a gem, including two stage cooling

Applicant: -
Publication: 2010-09-02
Filed: 2009-02-27
Status: application

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.

US20100218928A1: Method and apparatus for rapidly cooling a gem

Applicant: -
Publication: 2010-09-02
Filed: 2009-02-27
Status: application

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.

JP04482713B2

Applicant: -
Publication: 2010-06-16
Filed: 2002-08-30
Status: granted

Diamond cut design to provide considerable visual perceptible reflection comprising girdle, crown above girdle and pavilion below girdle

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Patent News nr. 79 (10-2010)



US20100250201A1: Method and system for improved optical modeling of gemstones

Applicant: Sivovolenko Sergey Borisovich, Finland

Publication: 2010-09-30

Filed: 2008-10-06

Status: application

A method of constructing a virtual model of a gemstone including the steps of performing measurements of the gemstone to construct a three-dimensional (3D) model of an exterior surface of the gemstone; identifying one or more visible inclusions within an interior volume of the gemstone; for each identified inclusion, performing the steps of determining a location and 3D shape of the inclusion within the interior volume of the gemstone; capturing at least one image of the inclusion; using the at least one image to determine relevant optical characteristics of the inclusion; and constructing a 3D virtual model of the inclusion, said model including the 3D shape of the inclusion and optical properties of the inclusion based upon said optical characteristics; constructing a 3D virtual model of the gemstone which includes the 3D virtual model of the exterior surface of the gemstone and the 3D virtual models of the one or more visible inclusions within the interior volume of the gemstone; and generating a dataset representing said 3D virtual model, wherein said dataset may be used in subsequent computer analysis to provide a user with information relating to a visual characteristic of the gemstone.

US20100242834A1: Method for producing single crystalline diamonds

Applicant: -

Publication: 2010-09-30

Filed: 2009-07-20

Status: application

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.

US20100241553A1: Method for calculating an index

Applicant: Gorenstein, Ran; Antwerp, Belgium
Publication: 2010-09-23
Filed: 2010-03-23
Status: application

A system and method for calculating an index relating to the trading of diamonds conforming to a particular profile, that thus makes diamonds amenable for derivative trading via futures contracts or the like.

US20100213175A1: Diamond etching method and articles produced thereby

Applicant: General Electric Company, United States of America
Publication: 2010-08-26
Filed: 2009-02-22
Status: application

There are provided simplified methods for etching diamond, as compared to conventional methods. More particularly, the methods disclosed herein involve contacting at least a portion of the diamond with a metal or metal oxide so that redox etching of the contacted portion of the diamond occurs. Also provided are diamonds polished using the present method, as well as optical windows, heat sinks, cutting tools and electrical components incorporating diamonds polished/etched via the disclosed method.

US7801268: Nondestructive method of measuring a region within an ultra-hard polycrystalline construction

Applicant: Smith International, United States of America
Publication: 2010-09-21
Filed: 2009-07-06
Status: granted

Methods for nondestructively measuring a characteristic within an ultra-hard polycrystalline construction comprises projecting a beam of energy from an emitter onto the construction. The energy is directed to a target region within the ultra-hard polycrystalline construction and passes through the construction where it is received by a detector. The target region can be within a diamond body of the construction, and can relate to an interface between two or more regions within the diamond body. The energy that is received by the detector is evaluated for the purpose of determining the desired measurement characteristic. In an example embodiment, the measured characteristic can be the interface of between two or more regions and the distance from a surface of the construction to the interface. The method can be used to generate an average distance within the construction, and to provide a visual image of the same in a nondestructive

manner.

US7800741: Method for evaluation of a gemstone

Applicant: Galatea Ltd., Israel
Publication: 2010-09-21
Filed: 2008-02-21
Status: granted

An apparatus for determining location of at least one inclusion in a gemstone having a first refractive index, comprising: a container adapted for containing a material having a second refractive index, a holder operative to support a gemstone in the material when the container contains the material; an illuminator positioned and adapted to illuminate said gemstone when disposed within said material in said container, with illumination at which said gemstone and said material have their respective first and second indices; a detector that detects illumination from the illuminated gemstone and said material and produces signals responsive thereto; a controller that receives the signals and is operative to determine a location of an inclusion in the gemstone based on the signals; and a system, operative to reduce the presence within said material, at least when the gemstone is disposed therein, of any substance other than inclusions, having a third refractive index.

US7800740: Method and apparatus for identifying and characterizing objects based on fluorescence

Applicant: Gumpesberger; Sylvia, Canada
Publication: 2010-09-21
Filed: 2007-08-24
Status: granted

A method and apparatus for characterizing objects. The method includes the steps of illuminating the object with incident red light having at least some wavelengths between 620 nms and 650 nms and detecting red light fluorescence from said object having a wavelength greater than visible wavelengths greater than that of the incident wavelengths, for example by using a filter. An apparatus including a source of red incident light, a detector for longer wavelength fluorescent light and a means for physically removing the detected objects from the rest is also provided. An embodiment of the present invention may be used in a mine, for example, to separate gem stones from less valuable ore rock or in prospecting to detect the presence of gems. In this embodiment the detection is not possible with the naked eye alone.

EP2227977A1: Ornamental diamond having two-stage pavilion

Applicant: Hohoemi Brains, Inc., Japan
Publication: 2010-09-15
Filed: 2008-01-09

Status: application

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

US7800753: Spectroscopic chemical analysis methods and apparatus

Applicant: Photon Systems, United States of America
Publication: 2010-09-21
Filed: 2009-03-06
Status: granted

Spectroscopic chemical analysis methods and apparatus are disclosed which employ deep ultraviolet (e.g. in the 200 nm to 300 nm spectral range) electron beam pumped wide bandgap semiconductor lasers, incoherent wide bandgap semiconductor light emitting devices, and hollow cathode metal ion lasers to perform non-contact, non-invasive detection of unknown chemical analytes. These deep ultraviolet sources enable dramatic size, weight and power consumption reductions of chemical analysis instruments. Chemical analysis instruments employed in some embodiments include capillary and gel plane electrophoresis, capillary electrochromatography, high performance liquid chromatography, flow cytometry, flow cells for liquids and aerosols, and surface detection instruments. In some embodiments, Raman spectroscopic detection methods and apparatus use ultra-narrow-band angle tuning filters, acousto-optic tuning filters, and temperature tuned filters to enable ultra-miniature analyzers for chemical identification. In some embodiments Raman analysis is conducted simultaneously with native fluorescence spectroscopy to provide high levels of sensitivity and specificity in the same instrument.

WO2010103526A1: Methods and systems of imaging cut stones

Applicant: Dsee Imaging Ltd. Israel
Publication: 2010-09-16
Filed: 2010-03-11
Status: application

A method of imaging a cut stone. The method comprises identifying an orientation of a cut stone, creating a volumetric model of the cut stone according to the orientation, capturing a plurality of images of the cut stone from a plurality of viewing angles around

the cut stone, cropping a plurality of segments depicting the cut stone from the plurality of images using the volumetric model and generating a volumetric image of the cut stone from the plurality of segments.

JP04521171B2:

Applicant: -
Publication: 2010-08-11
Filed: 2003-09-24
Status: granted

Oval girdle cut structure for diamond, has distance from center axis to lower girdle facet set at predetermined range by major axis

JP04495385B2:

Applicant: -
Publication: 2010-07-07
Filed: 2002-01-22
Status: granted

Diamond cutting method, involves establishing pair of upper girdle facets between upper main facets to form external shape of diamond

JP04482713B2:

Applicant: -
Publication: 2010-06-16
Filed: 2002-08-30
Status: granted

Diamond cut design to provide considerable visual perceptible reflection comprising girdle, crown above girdle and pavilion below girdle

JP04469552B2:

Applicant: -
Publication: 2010-05-26
Filed: 2001-06-14
Status: granted

High quality single crystal chemical vapor deposition diamond layer used for manufacturing chemical vapor deposition diamond used as gemstones and diamond anvils, has predetermined thickness

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Patent News nr. 80 (11-2010)



CN11848658A:

Applicant: -
Publication: 2010-09-29
Filed: 2008-04-22
Status: application

Heart shaped diamond has main pavilion facets that are aligned at fixed angle, comprise symmetrical pavilion half facets so that main facets meets at point corresponding to symmetrical center of diamond, girdle and table facet

WO2010078265A3: Method of cutting diamonds

Applicant: -
Publication: 2010-11-04
Filed: 2009-12-28
Status: application

In a method of taking a star facet of a diamond and extending its length to the girdle (the outside perimeter) of the diamond, a shield style (obelisk-shaped) facet is produced in rounds and fancy cut diamonds, and on square and off squares it remains a three-sided facet but is made larger and longer. The facet becomes larger than it was previously. It becomes a five-sided facet when it was a three before (or a much larger three-sided facet on squares and off squares). The reason it becomes five-sided is because when the facet is extended it collides with the bezel and both upper girdle facets as it extends to the girdle on rounds and fancy cut diamonds. The new facet on square and off square becomes longer and larger but remains three-sided. When the new star facet of rounds, fancy, square and off square diamonds collide with the others it produces a new larger facet and makes an exchange of positions of the previous largest facet which is true of all rounds, fancy, square and off square. This new facet has a different angle from the previous largest facet. Because of the adjustment it appears a little different because the world is used to the standard cuts. The new cut produces new angles for the largest facet and produces a very appealing display of light performance.

US20100278712A1: Method for creating diamond dust via detonation of carbon dioxide and reducing agent combinations

Applicant: -

Publication: 2010-11-04
Filed: 2008-12-22
Status: application

The present invention provides a method and formulation for the creation of a diamond-carbon bearing material of varying particle sizes. The material is a detonation by-product of explosive formulations that employ carbon dioxide as the oxidizing agent and a material, such as powdered magnesium, as the fuel for such detonation.

US20100272627A1: Multi-faceted diamond and associated methods

Applicant: -
Publication: 2010-10-28
Filed: 2010-02-23
Status: application

A method of making a multi-faceted diamond is provided. Such a method can include obtaining a diamond having a substantially euhedral morphology and a plurality of primary crystallographic faces and polishing a plurality of primary apexes defined by the primary crystallographic faces to form a plurality of secondary faces and secondary apexes.

US7807126: Diamond single crystal substrate

Applicant: Sumitomo Electric Industries, Osaka, Japan
Publication: 2010-10-05
Filed: 2009-02-03
Status: granted

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.

EP2245951A1: Ornamental diamond having two-stage pavilion

Applicant: Hohoemi Brains, Japan
Publication: 2010-11-03
Filed: 2008-01-09
Status: application

An ornamental diamond is provided as an extremely bright diamond with numerous reflection patterns when viewed from above its table facet and crown facets. The diamond has the same crown as the round brilliant cut and its pavilion consists of a first pavilion and a second pavilion separated by a horizontal division plane. Lower girdle facets and pavilion main facets are bent by the horizontal division plane between the first and second pavilions, and a first pavilion angle is larger than a second pavilion angle. The ornamental diamond having the two-stage pavilion is much more brilliant than and has twice as many reflection patterns as the conventional round brilliant cut.

JP2010159186A2: Substrate for growing single crystal diamond and method for manufacturing single crystal diamond using the substrate

Applicant: Shin-Etsu Chemical
Publication: 2010-07-22
Filed: 2009-01-09
Status: application

Problem to be solved: To provide a substrate for growing single crystal diamond capable of heteroepitaxially growing single crystal diamond of high crystallinity and being repeatedly usable, and a method for manufacturing single crystal diamond capable of manufacturing single crystal diamond having a large area and high crystallinity at a low cost.

Solution: The substrate for growing single crystal diamond has at least a seed-substrate consisting of a single crystal and a thin film heteroepitaxially grown on the seed-substrate, which is characterized by using single crystal diamond as the seed-substrate and iridium film or rhodium film as the thin film.

JP2010142743A2: High-temperature and high-pressure generation apparatus

Applicant: Nihon Univ
Publication: 2010-07-01
Filed: 2008-12-19
Status: application

Problem to be solved: To keep a substance pressurized at 1,000,000 atmospheric pressure or higher in a diamond anvil cell in a high-temperature state of 10,000°C or higher without melting the diamond anvil.

Solution: A sample is kept in a high pressure of 1,000,000 atmospheric pressure or higher in a diamond anvil cell. The kinetic energy of ion particles is controlled by controlling a full-range ion accelerator is controlled in a manner that the Bragg peak is conformed with an aimed heating position of the sample. Pulsed ion beam with repeated frequency of about 10 Hz is radiated to the sample to directly heat the sample at 10,000°C or higher. Since the sample is heated instantaneously by the pulsed ion beam, the diamond anvil is not melted. The abruptly heated sample is cooled quickly, so that the sample is put in a stable state at a normal temperature without turning back to the state before the heating. An innovative substance can be synthesized in the ultrahigh pressure and ultrahigh

temperature.

JP2010159465A2: DC plasma CVD apparatus, and method for manufacturing diamond using the same

Applicant: Shin-Etsu Chemical
Publication: 2010-07-22
Filed: 2009-01-09
Status: application

Problem to be solved: To provide a DC plasma CVD apparatus capable of obtaining a vapor growth film such as diamond of high quality free from any defect caused by the drop of a product by a fixed electrode, and a method for manufacturing the diamond of high quality using the apparatus.

Solution: The DC plasma CVD apparatus has at least a fixed electrode, and a substrate stage which is also used for an electrode for loading a substrate thereon. The substrate stage is not located on the line extending in the vertical direction from the center of the fixed electrode. Further, the angle formed between the line for connecting the center of the substrate stage to the center of the fixed electrode and the line extending in the vertical direction is $\leq 90^\circ$.

JP2010110799A2: Apparatus and method for machining hard and brittle material

Applicant: Univ of Yamanashi, Okaya Ichi
Publication: 2010-05-20
Filed: 2008-11-07
Status: application

Problem to be solved: To solve such problems that, when machining a hard and brittle material, i.e., a hard-to-work material such as cemented carbide and diamond, the material is broken by the buckling and cannot be machined in the mechanical finish by polishing or grinding when the shape is slender, and that an optional fore end shape is hardly formed in a non-contact machining method.

Solution: An optional fore end shape is formed by applying femtosecond laser beam via an optical system including a condensing lens while rotating and moving an object to be machined consisting of a hard and brittle material. Further, the finish surface roughness of the object can be controlled by changing the ellipticity of the femtosecond laser beam by operation of the optical system.

GB1013112A0: A diamond optical element

Applicant: Element Six Ltd, Univ Stuttgart
Publication: 2010-09-22
Filed: 2010-08-04
Status: granted

"State of the art" mailing service

Patent News nr. 81 (12-2010)



WO2010128891A1: Method for forming an identification mark for marking valuable items and a valuable item

Applicant: -
Publication: 2010-11-11
Filed: 2010-04-07
Status: application

A surface to be marked is polished and a processing layer is applied thereto, via which layer an image of a mark which can be rendered optically visible in reflected light at a diffraction angle is made on the aforesaid surface in the form of a diffraction structure. The structure is arranged in the manner of a reflective phase diffraction grating and is formed by ion etching the surface in conjunction with the structure of the processing layer. Before the mark is formed on the surface, a diffraction structure in the form of a regular microrelief with a sinusoidal profile is formed in the processing layer by ablation of the material thereof with a pulse of interfering beams of coherent laser radiation. As a result, the diffraction structure is formed in the processing layer with holographic precision. The structure is formed by the partial removal of the thickness of the processing layer material. Images of the mark in the form of a diffraction structure on the surface to be marked are also formed with holographic precision by interfering coherent laser beams. The diffraction structure formed in the processing layer is exposed to an ion beam.

WO2010128890A1: Identification mark for marking valuable items and a valuable item

Applicant: -
Publication: 2010-11-11
Filed: 2010-04-07
Status: application

The identification mark is in the form of an image made on a polished surface of an item, which image can be rendered optically visible and is in the form of a diffraction structure made up, in particular, of microscopic lines with a sinusoidal profile, which, in combination, form a diffractive raster image of the mark. The diffraction structure is spatially arranged in the manner of a reflective phase diffraction grating, which functions as a means for increasing contrast and altering the hue of the radiation spectrum as the image of the mark is visualized at the angle of diffraction in reflected light. Furthermore,

the microstructures of the diffraction structure are formed at a depth not greater than the acceptable size of microscopic irregularities in the polish of precious stones. The proposed valuable item has a polished surface with a marking in the form of an identification mark.

CN11873813A:

Applicant: -
Publication: 2010-10-27
Filed: 2009-01-22
Status: application

Gemstone i.e. princess cut diamond, has crown including four sides, and pavilion extending in direction from rectangular girdle, opposite to direction in which crown extends from girdle, where each side has star facets

US20100294196A1: Substrate for growing single crystal diamond layer and method for producing single crystal diamond substrate

Applicant: Shin-Etsu Chemical, Japan
Publication: 2010-11-25
Filed: 2010-04-26
Status: application

The present invention is a substrate for growing a single crystal diamond layer including: at least, a base material made of a single crystal diamond, and an iridium film or a rhodium film heteroepitaxially grown on a side of the base material where the single crystal diamond layer is to be grown; wherein a peripheral end portion of a surface of the base material on the side where the single crystal diamond layer is to be grown is chamfered with a curvature radius, the curvature radius satisfying $r \geq 50 \mu\text{m}$. As a result, there is provided a substrate for growing a single crystal diamond layer and a method for producing a single crystal diamond substrate, the substrate and the method in which a single crystal diamond having uniform and high crystallinity can be reproducibly produced at low cost.

US20100282234A1: Ornamental diamond having two-stage pavilion

Applicant: Hohoemi Brains, Japan
Publication: 2010-11-11
Filed: 2008-01-09
Status: application

An ornamental diamond is provided as an extremely bright diamond with numerous reflection patterns when viewed from above its table facet and crown facets. The diamond has the same crown as the round brilliant cut and its pavilion consists of a first pavilion and a second pavilion separated by a horizontal division plane. Lower girdle

facets and pavilion main facets are bent by the horizontal division plane between the first and second pavilions, and a first pavilion angle is larger than a second pavilion angle. The ornamental diamond having the two-stage pavilion is much more brilliant than and has twice as many reflection patterns as the conventional round brilliant cut.

US7844547: Uncle gem IV, universal automatic instant money, data and precious metal and stone transfer machine

Applicant: -
Publication: 2010-11-30
Filed: 2006-08-21
Status: granted

The Universal Automatic Instant Money, Data and Gold Transfer Machine, Uncle GEM II, system is a multiplicity of devices on a communications network available 24 hours a day, used interchangeably as sender, receiver and dispenser of funds and data. The sender accepts standard currency and includes removable medium storage devices to transfer to another such device acting as a receiver/dispenser. Remitted amounts are inserted or deducted from credit/debit accounts or currency and who pays the fees charged is indicated by an initiator of the transaction. Transfer transaction information includes: the type of transfer (money/funds or data); which device deducts the fee; how much money or what data to transfer; and to who and where the transfer transaction is to be made available. A receipt is generated by the sender via the system and a receiver becomes a dispenser when the recipient retrieves a pending transaction using the appropriate password or identification. The cash, data, or financial instrument is then dispensed. The Uncle GEMs also feature acceptance of alternate payment options, such as, precious metal coins, i.e., gold, silver and platinum, and precious stones, i.e. diamonds, sapphires, and rubies. In essence, virtually anything can be bought, purchased, bartered, traded or sold. Smartcards, phonecards and store specific cards can be used to buy goods and services, can be bought, or can be reloaded using the Uncle GEM II system.

US7837793: Method of manufacturing diamond substrates

Applicant: Element Six Limited, United Kingdom
Publication: 2010-11-23
Filed: 2004-07-26
Status: granted

A tiled array of diamond plates, which is suitable for wafer scale processing, for example, in the manufacture of electronic or other device structures on the diamond plates. The diamond plates are fixed to a support layer, preferably a polycrystalline diamond support layer, in a substantially planar arrangement such that at least one of the major surfaces of the respective fixed diamond plates defines a fabrication surface that is exposed for further processing. The support layer may be a backing layer, in which case only one of the major faces of the diamond substrate is exposed for further processing, or may extend between respective diamond substrates such that both major surfaces are exposed for

further processing.

US7834987: Systems and methods for evaluating the appearance of a gemstone

Applicant: Gemological Institute of America, United States of America
Publication: 2010-11-16
Filed: 2006-03-22
Status: granted

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

EP2253746A2: Coloured diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2010-11-24
Filed: 2003-09-05
Status: application published without search report

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

EP2253745A2: Coloured Diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2010-11-24
Filed: 2002-12-13
Status: application published without search report

A diamond layer of single crystal CVD diamond which is coloured and which has a thickness greater than 1 mm, wherein the hue angle is less than 80 degrees.

EP2253733A1: High colour diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2010-11-24
Filed: 2006-06-22
Status: application published with search report

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.

EP1537259B1: Method for altering the colour of a single crystal cvd diamond and diamond layer produced thereby

Applicant: Element Six Limited, United Kingdom
Publication: 2010-11-24
Filed: 2003-09-05
Status: patent specification

Production of a single crystal vapor deposition diamond e.g. gemstone of a desired color involves heat treating the diamond under specific temperature conditions

EP1466041B1: Coloured diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2010-11-24
Filed: 2002-12-13
Status: patent specification

Diamond layer of single crystal chemical vapor deposition for use in preparing e.g. gemstone, is colored and has specified thickness. A diamond layer of single crystal CVD diamond which is coloured and which has a thickness greater than 1 mm, wherein the hue angle is less than 80 degrees, and wherein the colour is a fancy colour with a dominant brown component.

JP04495385B2:

Applicant: -
Publication: 2010-07-07
Filed: 2002-01-22
Status: granted

Diamond cutting method, involves establishing pair of upper girdle facets between upper main facets to form external shape of diamond

JP2010150069A2: Large-area diamond crystal substrate and method for producing the same

Applicant: National Institute of Advanced Industrial Science & Technology
Publication: 2010-07-08
Filed: 2008-12-25
Status: application

Problem to be solved: To provide a method for producing a good-quality large-area single crystal substrate by bonding a plurality of single crystal diamond substrates having uniform quality to one another by a comparatively simple operation.

Solution: The method for producing the large-area substrate consisting of single crystal diamonds comprises: a step (1) of forming a separation layer on a master substrate consisting of single crystal diamonds by ion implantation; a step (2) of separating one or more single crystal diamond layers from the master substrate; a step (3) of placing a plurality of the separated single crystal diamond layers on a flat support in such a state that the side faces of the adjacent single crystal diamond layers are in contact with each other and the separated surface of each single crystal diamond layer from the master substrate is in contact with the surface of the support; a step (4) of growing a single crystal diamond on the plurality of the single crystal diamond layers placed on the support by a vapor phase synthesis method to bond the plurality of the single crystal diamond layers to one another; and a step (5) of turning over the bonded single crystal diamond layers on the support and growing the single crystal diamond by the vapor phase synthesis method to grow the single crystal diamond on the surface separated from the master substrate.

JP2010159186A2: Substrate for growing single crystal diamond and method for manufacturing single crystal diamond using the substrate

Applicant: Shin-Etsu Chemical
Publication: 2010-07-22
Filed: 2009-01-09
Status: application

Problem to be solved: To provide a substrate for growing single crystal diamond capable of heteroepitaxially growing single crystal diamond of high crystallinity and being repeatedly usable, and a method for manufacturing single crystal diamond capable of manufacturing single crystal diamond having a large area and high crystallinity at a low cost.

Solution: The substrate for growing single crystal diamond has at least a seed-substrate consisting of a single crystal and a thin film heteroepitaxially grown on the seed-substrate, which is characterized by using single crystal diamond as the seed-substrate and iridium film or rhodium film as the thin film.

JP2010179394A2: Diamond polishing apparatus and method

Applicant: Tokyo Metropolitan Industrial Technology Research Institute

Publication: 2010-08-19
Filed: 2009-02-04
Status: application

Problem to be solved: To quickly and efficiently polish diamond that coats the subject of polishing.

Solution: The diamond polishing apparatus 1 includes: a polishing tool 20 polishing diamond coating Db of the subject of polishing by making line contact or surface contact with the diamond coating Db; an ultrasonic vibration system 30 which applies the ultrasonic wave to the polishing tool 20; and a load control mechanism 35 which controls the polishing tool 20 in such a way as to press the polishing tool against the diamond coating Db under certain load.

JP2010142743A2: High-temperature and high-pressure generation apparatus

Applicant: NIHON UNIV
Publication: 2010-07-01
Filed: 2008-12-19
Status: application

Problem to be solved: To keep a substance pressurized at 1,000,000 atmospheric pressure or higher in a diamond anvil cell in a high-temperature state of 10,000°C or higher without melting the diamond anvil.

Solution: A sample is kept in a high pressure of 1,000,000 atmospheric pressure or higher in a diamond anvil cell. The kinetic energy of ion particles is controlled by controlling a full-range ion accelerator is controlled in a manner that the Bragg peak is conformed with an aimed heating position of the sample. Pulsed ion beam 3 with repeated frequency of about 10 Hz is radiated to the sample to directly heat the sample at 10,000°C or higher. Since the sample is heated instantaneously by the pulsed ion beam, the diamond anvil 1 is not melted. The abruptly heated sample is cooled quickly, so that the sample is put in a stable state at a normal temperature without turning back to the state before the heating. An innovative substance can be synthesized in the ultrahigh pressure and ultrahigh temperature.

JP2010159465A2: DC plasma CVD apparatus, and method for manufacturing diamond using the same

Applicant: Shin-Etsu Chemical
Publication: 2010-07-22
Filed: 2009-01-09
Status: application

Problem to be solved: To provide a DC plasma CVD apparatus capable of obtaining a vapor growth film such as diamond of high quality free from any defect caused by the drop of a product by a fixed electrode, and a method for manufacturing the diamond of high quality using the apparatus.

Solution: The DC plasma CVD apparatus has at least a fixed electrode, and a substrate stage which is also used for an electrode for loading a substrate thereon. The substrate stage is not located on the line extending in the vertical direction from the center of the fixed electrode. Further, the angle formed between the line for connecting the center of the substrate stage to the center of the fixed electrode and the line extending in the vertical direction is $\leq 90^\circ$.

JP2010110799A2: Apparatus and method for machining hard and brittle material

Applicant: Univ of Yamanashi / Okaya Ichi
Publication: 2010-05-20
Filed: 2008-11-07
Status: application

Problem to be solved: To solve such problems that, when machining a hard and brittle material, i.e., a hard-to-work material such as cemented carbide and diamond, the material is broken by the buckling and cannot be machined in the mechanical finish by polishing or grinding when the shape is slender, and that an optional fore end shape is hardly formed in a non-contact machining method.

Solution: An optional fore end shape is formed by applying femtosecond laser beam via an optical system including a condensing lens while rotating and moving an object to be machined consisting of a hard and brittle material. Further, the finish surface roughness of the object can be controlled by changing the ellipticity of the femtosecond laser beam by operation of the optical system.

HK1078906A1: Single crystal diamond

Applicant: Element Six Ltd, United Kingdom
Publication: 2010-11-12
Filed: 2005-11-25
Status: granted standard patent
