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Patent News nr. 115 (01-2014)

EP2211656B1: Gemstones and methods for controlling the appearance thereof
Applicant: California Institute of Technology, United States of America
Publication: 2013-12-25
Filed: 2008-11-28
Status: granted

Methods of fabricating improved gemstones and gemstones thus obtained are described. Roughness is introduced on facets of a gemstone through application of nanometer and/or micrometer sized features, to provide the facets with a hazy white-colored appearance. Alternatively, millimeter-sized reflective features can be applied on the facets, to form a gemstone with improved scintillation or play of light.

US20140013801A1: Hearts & Arrows SiC Gemstone
Applicant: Betterthandiamond, United States of America
Publication: 2014-01-16
Filed: 2013-01-02
Status: application

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

US8616192: Round brilliant cut gemstone and method for cutting the same
Applicant: -
Publication: 2013-12-31
Filed: 2010-12-06
Status: granted

The invention relates to a gemstone comprises a girdle, a crown and a pavilion. The crown comprises a table, eight star facets surrounding the table, eight first half facets aligned between the star facets, eight second half facets aligned adjacent to the first half facets and sixteen upper girdle facets aligned between the second half facets. The pavilion comprises sixteen pavilion main facets and sixteen lower girdle facets aligned between the pavilion main facets. The invention also relates to a method of cutting the

gemstone.

US20130335837A1: Engraved gemstone viewer for personal communications devices
Applicant: GemEx Systems, United States of America
Publication: 2013-12-19
Filed: 2013-05-23
Status: application

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

JP2013099428A2: Jewelry
Applicant: K Uno
Publication: 2013-05-23
Filed: 2011-11-08
Status: application

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

JP2013150367A2: Diamond
Applicant: Sasagawa Dai
Publication: 2013-08-01

Filed: 2011-07-26
Status: application

Problem to be solved: To provide a method for producing a carbon diamond.
Solution: There are provided 144 pink diamonds and seven arrows which are produced by heating pneumatically using an open tube. Diamond is produced by heating at once a cubic graphite chamfered at the upper four corners at 2,200°C for about 10 min. The graphite of 0.3 g becomes the diamond of 0.2 g (1 carat). The graphite of up to 41 times of 0.3 g is converted into diamond by the above method. The graphite of 42 to 120 times can be converted at 2,500°C for about 10 min. It is necessary to take out of the open tube after 10 min. The diamond is produced by heating at once the cubic graphite of 121 to 149 times of 0.3 g, chamfered at the upper four corners at 2,500°C, and is taken out after 10 min. The diamond is produced by heating at once a cubic graphite of 150 to 400 times of 0.3 g, chamfered at 8 corners at 2,500°C, and is taken out after 10 min. The graphite of 400 times or more explodes by heating over 15 min.

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

The present invention relates to a method for producing colorless, single-crystal diamonds at a rapid growth rate. The method for diamond production includes controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface of the diamond are less than about 20° C., and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface of a diamond at a growth temperature in a deposition chamber having an atmosphere, wherein the atmosphere comprises from about 8% to about 20% CH4 per unit of H2 and from about 5 to about 25% O2 per unit of CH4. The method of the invention can produce diamonds larger than 10 carats. Growth rates using the method of the invention can be greater than 50 μm/hour.

JP2013542906A2
Applicant: -
Publication: 2013-11-28
Filed: 2010-10-11
Status: application

The present application discloses the details of a microwave plasma chemical vapor deposition process that uses Nitrogen and Diborane simultaneously in combination along with the Methane and Hydrogen gases to grow white color diamonds. The invention embodies using nitrogen to avoid inclusions and impurities in the CVD diamond samples and Diborane for the color enhancement during the growth of diamond. It is also found

that heating of the so grown diamonds to 2000 C results in significant color enhancement due to the compensation of Nitrogen and Boron centers in the samples. The origin of the various colors in diamond is explained on the basis of the band diagram of CVD diamond.

JP2013177270A2: Method and apparatus for producing single crystal diamond
Applicant: Kurita Seisakusho
Publication: 2013-09-09
Filed: 2012-02-28
Status: application

Problem to be solved: To provide a method and an apparatus for producing a single crystal diamond using a plasma CVD method capable of maintaining generated plasma stably, and growing a single crystal diamond inexpensively.
Solution: In a method for producing a single crystal diamond making a single crystal diamond grow on a substrate of one electrode by supplying raw material gas and by using plasma generated between electrodes, the position of the plasma is adjusted by a magnetic field formed by a magnetic field generation means. An apparatus for producing a single crystal diamond is also provided.

KR2013114994A: Apparatus for chemical vapor deposition for diamond film and method for synthesis of diamond film
Applicant: Korea Inst Sci & Tech, Republic of Korea
Publication: 2013-10-21
Filed: 2012-04-10
Status: application

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

JP2013189373A2: High color diamond layer
Applicant: Element Six
Publication: 2013-09-26
Filed: 2013-04-24
Status: application

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

JP05344464B2
Applicant: -
Publication: 2013-11-20
Filed: 2007-04-27
Status: granted

A method for surface treatment of diamond comprising exposing the surface of diamond to UV light containing wavelengths of 172 nm to 184.9 nm and 253.7 nm at an integrated exposure of 10 to 5,000 J/cm2 in an environment of an atmosphere having an oxygen concentration of 20 to 100% and an ozone concentration of 10 to 500,000 ppm to adsorb oxygen on the surface of diamond.

JP2013166677A2: Surface processing method of diamond
Applicant: Kanazawa Univ, National Institute Of Advanced Industrial Science & Technology
Publication: 2013-08-29
Filed: 2012-02-16
Status: application

PROBLEM TO BE SOLVED: To provide a method for simply and safely performing flattening or oxygen termination processing on a diamond surface.
SOLUTION: In the presence of a hydrogen source substance, oxidation processing is performed at a temperature of 300 to 1,200°C. The oxidation processing is performed under conditions where the concentration of O2 in an inert gas is 0.01 to 30% and the concentration of H2O is twice or more the concentration of O2. Furthermore, if the oxidation processing can be performed in the presence of an oxygen source, the oxidation needs not necessarily use oxygen. Heating to a range of 300 to 1,200°C results from considering a reaction time, substantial reaction does not progress at lower than 300°C and in the case of reaction under atmospheric pressure or the like, heating may be performed to a range of 300 to 1,200°C or higher preferably of 400 to 800°C.

JP05294526B2
Applicant: -
Publication: 2013-09-18
Filed: 2001-04-02

Status: granted

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

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

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

JP2013146780A2: Method for laser processing brittle material substrate
Applicant: Mitsuboshi Diamond Industrial Co Ltd
Publication: 2013-08-01
Filed: 2012-01-23
Status: application

Disclosed are a laser processing method for brittle material substrate and laser processing device for brittle material substrate. Cracking of front of a brittle material substrate during boring of the brittle material substrate by irradiating laser is minimized. The laser processing method is a method for boring of the brittle material substrate by irradiating laser and comprises a first step where laser irradiates on the back of the brittle material substrate so that the laser focus moves from the back of the brittle material substrate to the front for boring until the preset depth to the back of the brittle material substrate is reached, and a second step where laser irradiates on the front of the brittle material substrate so that the laser focus moves from the front of the brittle material substrate to the front corresponding to the hole formed in the first step to form a hole communicating with the hole formed in the first step.

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Patent News nr. 116 (02-2014)

WO2014016609A1: Jewelry with tag
Applicant: Kiroco Limited, United Kingdom
Publication: 2014-01-30
Filed: 2013-07-26
Status: application

A piece of jewelry, wherein the jewelry comprises at least one tag or chip programmed with at least a unique identification code, and a tag reader is configured to read the tag or chip when the tag reader and the piece of jewelry touch, or come into close contact and, display a message or content associated with the unique identification code.

US20140033765A1: Method for determining a cut for a gemstone
Applicant: Octonus Dia-Tech Private, Surat, India
Publication: 2014-02-06
Filed: 2012-03-20
Status: application

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

US20140026616A1: Decagonal shaped diamond which displays hearts and arrows pattern
Applicant: Worldwide Diamond Trademarks, Canada

Publication: 2014-01-30
Filed: 2013-09-30
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, ten subsidiary pavilion half facets, twenty subsidiary pavilion 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.

CN101721021B: Cut diamond and cutting method
Applicant: -
Publication: 2013-12-25
Filed: 2009-10-22
Status: granted

A cut diamond and its cutting method. The 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.

US20140020620A1: Diamond
Applicant: -
Publication: 2014-01-23
Filed: 2013-09-06
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 utilized. Single crystal diamond seeds having an aspect ratio of at least 1.5 and synthetic single crystal diamond which may be obtained by the method recited are also described. The growth surface is substantially aligned along a <100> or <110> direction in the plane

of the growth surface.

US8639479: Method and system for improved optical modeling of gemstones
Applicant: Ideal-Scope, Australia
Publication: 2013-08-01
Filed: 2011-07-26
Status: granted

Methods of constructing a virtual model of a gemstone are provided. Aspects of the methods include 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; 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.

WO2014009919A2: Kimberlite based products
Applicant: Rudraram Research Institute of Agriculture & Sciences India
Publication: 2014-01-16
Filed: 2013-07-12
Status: application

The present invention relates to the field of material sciences. In particular, this invention pertains to production Kimberlite base products.

WO2014003110A1: Diamond single crystal and production method thereof, and single crystal diamond tool
Applicant: Sumitomo Electric Industries, Japan
Publication: 2014-01-03
Filed: 2013-06-27
Status: application

The present invention is a diamond single crystal synthesised by chemical vapour synthesis, having an absorption co-efficient of 25-80cm-1 inclusive for light having a wavelength of 350nm. In addition, the production method of the diamond single crystal comprises: a step for reducing transmissivity for light having a wavelength of 800nm by implanting non carbon ions into the principal surface of a diamond single crystal seed substrate, said principal surface being a surface within a 7º off angle from the (100) surface; and a step for homoepitaxial growth of diamond single crystals by chemical vapour synthesis on the principal surface of the seed substrate. The principal surface is implanted with ions under synthesis conditions in which: the ratio NC/NH, where NC is the number of vapour-phase molecules containing carbon and NH is the number of hydrogen molecules, is 10-40% inclusive; the ratio NN/NC, where NN is the number of nitrogen molecules and NC is the number of molecules containing carbon, is 0.1-10%

inclusive; and the seed substrate temperature (T) is 850ºC or higher but lower than 1000ºC.

JP05362993B2
Applicant: -
Publication: 2013-12-11
Filed: 2005-12-09
Status: granted

This invention relates to a method of improving the crystalline perfection of IIa diamond crystals by heating the grown diamond crystals at an elevated temperature and an elevated pressure. The invention extends to grown diamond material having a low extended defect density with low nitrogen concentration.

JP05377212B2
Applicant: -
Publication: 2013-12-25
Filed: 2009-10-13
Status: granted

A base material for growing a single crystal diamond that includes at least a single crystal SiC substrate, and an iridium film or a rhodium film heteroepitaxially grown on a side of the single crystal SiC substrate where the single crystal diamond is to be grown. As a result, there is provided a base material for growing a single crystal diamond and a method for producing a single crystal diamond substrate which can grow the single crystal diamond having a large area and good crystallinity and produce a high quality single crystal diamond substrate at low cost.

JP05368634B2
Applicant: -
Publication: 2013-12-18
Filed: 2010-06-25
Status: granted

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

JP05362992B2
Applicant: -
Publication: 2013-12-11
Filed: 2004-12-09
Status: granted

In a method of synthesizing 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 pre-treated 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 synthesized 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).

US20140004319A1: Dislocation engineering in single crystal synthetic diamond material
Applicant: Dhillon Harpreet Kaur; Davies Nicholas Mattew; Khan Rizwan; Uddin Ahmad; Twitchen Daniel James; Martineau Philip Maurice; Element Six, United Kingdom
Publication: 2014-01-02
Filed: 2011-12-16
Status: application

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

GB1320304A0: Methods of fabricating synthetic diamond materials using microwave plasma actived chemical vapour deposition techniques and products obtained using said
Applicant: Element Six
Publication: 2014-01-01
Filed: 2013-11-18
Status: application

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Patent News nr. 117 (03-2014)

WO2014035344A1: Apparatus and method of producing diamond
Applicant: IIA Technologies, Singapore
Publication: 2014-03-06
Filed: 2013-08-29
Status: application

An apparatus for producing diamond and performing real time in situ analysis, comprising: a housing, a reaction chamber, the reaction chamber being structurally connected to the housing, the reaction chamber comprising of an enclosed area adapted to house the growing of diamonds, a radiating means, the radiating means being mounted above the reaction chamber within the housing, the radiating means adapted to emit microwave into the reaction chamber to effect the growth of diamonds within the reaction chamber, a dielectric cover being provided at the top of the reaction chamber and adapted to allow the radiation wave from the radiating means to enter the reaction chamber, a recording means mounted within the annual housing and above the reaction chamber, a measuring mechanism arranged at the periphery of the reaction chamber, a microscope adjacently arranged on the outside of the reaction chamber.

WO2014029671A1: Method of cutting super-hard materials using an electron beam and a range of beam scanning velocities
Applicant: Element Six Limited, United Kingdom
Publication: 2014-02-27
Filed: 2013-08-14
Status: application

A method of cutting a super-hard material using an electron beam, wherein the electron beam is directed onto a surface of the super-hard material and moved relative to the surface such that the electron beam moves across the surface of the super-hard material at an electron beam scanning velocity in a range 100 to 5000 mms-1 to cut the super-hard material.

US20140063485A1: Gemstone registration system and system for evaluating the quality of a gemstone cut
Applicant: Gemological Appraisal Association, United States of America
Publication: 2014-03-06

Filed: 2013-10-08
Status: application

A computer-implemented system is provided and includes a processor and a memory accessible by the processor, with the system being configured to measure light performance properties of a gemstone and generate an objective grade for the gemstone. The gemstone is analyzed with respect to a light return property, an optical symmetry property and a scintillation property of the gemstone and an objective grade for each is generated.

US20140043011A1: Gem tester
Applicant: Sy Kessler Sales, United States of America
Publication: 2014-02-13
Filed: 2013-10-21
Status: application

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

US20140041574A1: Diamond producing method and dc plasma enhanced CVD apparatus
Applicant: Shin-Estu Chemical, Tokyo, Japan
Publication: 2014-02-13
Filed: 2013-07-30
Status: application

Diamond is grown on a substrate from a mixture of a carbon-containing gas and hydrogen gas, by a DC plasma enhanced CVD process of applying a DC voltage between a stage electrode for holding the substrate and a voltage-applying electrode. During the step of growing diamond by applying a DC voltage, a single pulse voltage of opposite polarity to the DC voltage for diamond growth is applied between the stage electrode and the voltage-applying electrode at a predetermined timing. Diamond of quality is produced at a stable growth rate.

EP2108714B1: Microwave plasma CVD system
Applicant: Sumitomo Electric Industries, Japan
Publication: 2014-03-12
Filed: 2007-01-29

Status: granted

The present invention provides a microwave plasma CVD device that can satisfactorily perform plasma position control under a condition capable of fabricating a large-area high-quality diamond thin film or the like. A microwave plasma CVD device includes: a vacuum chamber having, in the center of its upper portion, an open portion for introducing microwaves; a base material support table for supporting a base material inside the vacuum chamber; a waveguide for guiding the microwaves to the open portion; a dielectric window for introducing the microwaves to the inside of the vacuum chamber; and an antenna portion for introducing the microwaves to the vacuum chamber, the antenna portion being configured by a round rod portion that is positioned in the center of the waveguide, the open portion and the dielectric window and an electrode portion that holds the dielectric window between the electrode portion and the upper portion of the vacuum chamber for vacuum retention, wherein an end surface of the electrode portion is formed wider than the dielectric window such that the dielectric window is hidden, and a concave portion of a predetermined size is formed in the surface of the electrode portion that faces the center of the vacuum chamber.

WO2014036460A2: Gem identification method and apparatus using digital imaging viewer

Applicant: Gemex Systems, United States of America
Publication: 2014-03-06
Filed: 2013-08-30
Status: application

A system and an apparatus for capturing a digital image of a particular gemstone from which specific and unique data can be extracted using digital image processing analysis, which data is used to positively identify a single gemstone from a database of gemstone images.

US20140063292A1: Gem identification method and apparatus using digital imaging viewer

Applicant: Gemex Systems, United States of America
Publication: 2014-03-06
Filed: 2013-08-30
Status: application

A system and an apparatus for capturing a digital image of a particular gemstone from which specific and unique data can be extracted using digital image processing analysis, which data is used to positively identify a single gemstone from a database of gemstone images.

US20140067331A1: Gemstone cut grading method and apparatus

Applicant: -
Publication: 2014-03-06
Filed: 2012-08-29
Status: application

A system for controlling the cut of a gemstone includes a gemstone scanner adapted to scan a plurality of facets of an actual gemstone so as to determine facet parameters pertaining to each one of the plurality of facets. The system also includes a control module operatively coupled to the gem scanner and adapted to receive the determined facet parameters of the plurality of facets of the gemstone. The control module generates an actual 3D model of the actual gemstone from determined facet parameters and an idealized 3D model for an idealized gemstone. The control module compares the actual 3D model with the idealized 3D model to determine leakage values for facet parameters of each one of the facets of the gemstone such that the leakage value is used to control the cut of the gemstone. A method implemented by the system is also disclosed.

CN102501165B: Processing method of gem with 102 cutting surfaces
Applicant: -
Publication: 2014-02-26
Filed: 2011-11-02
Status: granted

The invention relates to a processing method of a gem with 102 cutting surfaces, relating to the technical field of gem processing, in particular to anti-traditional gem cutting, and overcoming the technical defects of fewer cutting surfaces and poor optical effects of the gem cut in the traditional gem processing method. The processing method comprises the following steps: 1) polishing the pre-shape and the surface of a gem blank with a gem polishing instrument; 2) sequentially polishing the crown part of the gem into 16 kite-type facets, 16 star-type facets and 16 upper waist-type facets; and 3) sequentially polishing the pavilion part of the gem into 12 first lower waist star-type facets, 8 second lower waist star-type facets and 1 sharp position. By adopting the gem processing method, 102 cutting surfaces can be formed, lights can be reflected and refracted more times by the gem, ideal optical effects and visual effects can be achieved, the gem is gorgeous, and good optical and artistic effects can be achieved.

RU12131173A:
Applicant: -
Publication: 2014-01-27
Filed: 2010-12-15
Status: application

A method of producing a grown single crystal diamond substrate comprises: providing a first diamond substrate which presents a (001) major surface, bounded by at least one < 100 > edge, the length of the said at least one <100> edge exceeding any dimension of

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

CA2608933C: Colorless single-crystal cvd diamond at rapid growth rate

Applicant: Carnegie Inst of Washington, United States of America
Publication: 2014-02-04
Filed: 2006-05-23
Status: granted

The present invention relates to a method for producing colorless, single-crystal diamonds at a rapid growth rate. The method for diamond production includes controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface of the diamond are less than about 20 0C, and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface of a diamond at a growth temperature in a deposition chamber having an atmosphere, wherein the atmosphere comprises from about 8 % to about 20 % CH4 per unit of H2 and from about 5 to about 25 % O2 per unit of CH4. The method of the invention can produce diamonds larger than 10 carats. Growth rates using the method of the invention can be greater than 50 µm/hour.

EP2622115A4: Method for growing white color diamonds by using diborane and nitrogen in combination in a microwave plasma chemical vapor deposition system

Applicant: IIA Technologies, Singapore
Publication: 2014-03-05
Filed: 2010-10-11
Status: application

The present application discloses the details of a microwave plasma chemical vapor deposition process that uses Nitrogen and Diborane simultaneously in combination along with the Methane and Hydrogen gases to grow white color diamonds. The invention embodies using nitrogen to avoid inclusions and impurities in the CVD diamond samples and Diborane for the color enhancement during the growth of diamond. It is also found that heating of the so grown diamonds to 2000 C results in significant color enhancement due to the compensation of Nitrogen and Boron centers in the samples. The origin of the various colors in diamond is explained on the basis of the band diagram of CVD diamond.

AU9260912BB: Method for growing monocrystalline diamonds

Applicant: IIA Technologies / Indian Inst Technology, Bombay
Publication: 2014-02-13
Filed: 2009-06-18
Status: granted

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.

WO2011114102A8: Method for synthesising diamond
Applicant: Designed Materials Limited / Stoneham Doreen, United Kingdom
Publication: 2014-03-06
Filed: 2011-03-16
Status: application

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

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

Problem to be solved: To provide a diamond cut evaluate program and a diamond cut evaluate method for outputting an objective reference to a cut evaluation by digitizing and visualizing a cut (shape) being one of four factors when evaluating a diamond as a jewelry.

Solution: The diamond cut evaluate program and the diamond cut evaluate method is constituted by carrying out following steps. (A) a step for three-dimensionally measuring the shape of the diamond and obtaining three-dimensional shape data, (B) a step for restoring the shape from the obtained three-dimensional data and simulating an advancing passage of a light beam by irradiating a simulated light beam to the restored shape, (C) a step for evaluating the right and wrong of the diamond cut based of the simulation of the advancing passage of the simulated light beam, and (D) a step for outputting an evaluation result.

JP2013540198A2:
Applicant: -
Publication: 2013-10-31
Filed: 2011-08-02
Status: application

A method of manufacturing an optical element, the method comprising: growing a first layer of single crystal diamond material via a chemical vapour deposition technique using a gas phase having a first nitrogen concentration; growing a second layer of single crystal diamond material over said first layer via a chemical vapour deposition technique using a gas phase having a second nitrogen concentration, wherein the second nitrogen concentration is lower than the first nitrogen concentration; forming an optical element from at least a portion of the second layer of single crystal diamond material; and forming an out-coupling structure at a surface of the optical element for increasing out-coupling of light.

US20140048016A1: Microwave plasma reactor for manufacturing synthetic diamond material
Applicant: -
Publication: 2014-02-20
Filed: 2011-12-14
Status: application

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

USD699620: Multi-faceted gemstone

Applicant: Rosy Blue Jewelry, United States of America
Publication: 2014-02-18
Filed: 2013-07-22
Status: granted

The ornamental design for a multi-faceted gemstone, as shown.

USD699619: Gemstone design
Applicant: Rosy Blue Jewelry, United States of America
Publication: 2014-02-18
Filed: 2012-03-19
Status: granted

The ornamental design for a gemstone design, as shown.

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Patent News nr. 118 (04/05-2014)

WO2014056008A1: Cut for gemstone
Applicant: D. Swarovski, Austria
Publication: 2014-04-17
Filed: 2013-10-09
Status: application

The invention relates to a gemstone having a chaton cut, in which a crown adjoins a flat table and has facets that are inclined downwardly relative to the table all the way round, wherein the crown has main facets that extend substantially from the table as far as a girdle at which the gemstone has the largest transverse dimension, and wherein a pavilion of facets, preferably facets converging to a point, adjoins below the girdle, and wherein the gemstone consists preferably entirely of topaz, wherein the angle of the main facets relative to a cross-sectional face arranged parallel to the table is between 32.5° and 34.5°.

US20140075991A1: Multi-color gemstone coating technology
Applicant: -
Publication: 2014-03-20
Filed: 2012-09-19
Status: application

The present invention discloses a gemstone comprising a table, a crown and a pavilion. Certain areas of the surfaces of the gemstone are coated with at least one layer of multi-color thin film comprising at least two types of metallic compounds. A layer of DLC protective coating is deposited on top of the multi-color thin film. The said multi-color thin film can be deposited on the table of the gemstone, the table and crown of the gemstone, on certain areas of the pavilion, or on all surfaces of the gemstone. The deposition of the multi-color thin film can be achieved through several low temperature vapor-coating techniques such as sputtering, chemical vapor deposition (CVD) and physical vapor deposition (PVD), ARC Source deposition, PLD, and MED.

EP2713800A1: Method for determining a cut for a gemstone
Applicant: Octonus Finland
Publication: 2014-04-09
Filed: 2012-03-20
Status: application

US20140116088A1: Gemstone cut
Applicant: -
Publication: 2014-05-01
Filed: 2012-10-26
Status: application

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

ES2431440BB: Procedimiento para la mejora del contraste óptico en la elaboración de grabados a nanoescala
Applicant: Univ Cadiz, Spain
Publication: 2014-04-09
Filed: 2012-04-24
Status: patent published after examination

Procedimiento para la mejora del contraste óptico en la elaboración de grabados a nanoescala. El marcado de piedras preciosas y otros cristales mediante nanograbado es muy importante en joyería para permitir un estricto control de los mismos durante su distribución y compra-venta. Además, permite convertirlos en piezas exclusivas y/o añadirles un valor sentimental seleccionando cuidadosamente el motivo que será grabado en el mismo. Sin embargo, debido al carácter translúcido de la mayoría de piedras preciosas, la visualización del nanograbado por medios ópticos no está optimizada. El objeto de la invención es la mejora en el contraste óptico de nanograbados realizados en piedras preciosas mediante la deposición de materiales en el nanograbado, preferentemente metales preciosos. Dicha mejora puede ocurrir porque la deposición de un material opaco aumenta la reflexión y la absorción de la luz respecto de la piedra translúcida, y/o porque la deposición de metales nanoestructurados puede producir efectos plasmónicos.

AT46600051A1: Schliff für Schmuckstein
Applicant: Swarovski D, Austria
Publication: 2014-04-15
Filed: 2012-10-12

Status: application

Schmuckstein mit einem Chatonschliff, bei dem sich an eine ebene Tafel eine Krone mit rundherum schräg gegenüber der Tafel abfallenden Facetten anschließt, wobei die Krone Hauptfacetten aufweist, die im wesentlichen von der Tafel bis zu einer Rondiste reichen, an welcher der Schmuckstein die größte Querabmessung aufweist und wobei unterhalb der Rondiste ein Pavillon aus vorzugsweise spitz zusammenlaufenden Facetten anschließt und wobei der Schmuckstein vorzugsweise zur Gänze aus Topas besteht, wobei der Winkel der Hauptfacetten gegenüber einer zur Tafel parallel angeordneten Querschnittsfläche zwischen 32,5° und 34,5° beträgt.

WO2014058908A1: Gemstone registration and cut quality system
Applicant: GEMOLOGICAL APPRAISAL ASSOCIATION, United States of America
Publication: 2014-04-17
Filed: 2013-10-08
Status: application

A computer-implemented system is provided and includes a processor and a memory accessible by the processor, with the system being configured to measure light performance properties of a gemstone and generate an objective grade for the gemstone. The gemstone is analyzed with respect to a light return property, an optical symmetry property and a scintillation property of the gemstone and an objective grade for each is generated.

WO2014044607A1: Single crystal chemical vapour deposited synthetic diamond materials having uniform colour
Applicant: Element Six Limited, United Kingdom
Publication: 2014-03-27
Filed: 2013-09-13
Status: application

A coloured single crystal CVD synthetic diamond material comprising: a plurality of layers, wherein the plurality of layers includes at least two sets of layers which differ in terms of their defect composition and colour, wherein defect type, defect concentration, and layer thickness for each of the at least two sets of layers is such that if the coloured single crystal CVD diamond material is fabricated into a round brilliant cut diamond comprising a table and a culet, and having a table to culet depth greater than 1 mm, the round brilliant cut diamond comprises a uniform colour as viewed by naked human eye under standard ambient viewing conditions in at least a direction through the table to the culet.

US20140107986A1: Method and system for improved optical modeling of gemstones

Applicant: Ideal-Scope, Canterbury, Australia
Publication: 2014-04-17
Filed: 2013-12-13
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.

US20140101204A1: Method and system for providing a clarity grade for a gem
Applicant: Gemological Institute Of America (GIA), United States of America
Publication: 2014-04-10
Filed: 2013-03-18
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.

US20140097354A1: Systems and Methods to Measure and Display the Scintillation Potential of a Diamond or Other Gemstone
Applicant: American Gem Society, United States of America
Publication: 2014-04-10
Filed: 2013-10-10

Status: application

Systems and methods for generating an image of a gemstone under evaluation which is coded according to angular ranges in its angular spectrum across a broad range of tilts, this allows for scintillation of a gemstone to be demonstrated based on a singular coded image of the gemstone. Scintillation information is thus presented in a single image, or as a plurality of images showing fire scintillation, flash scintillation, and other scintillation related criteria as a series of static images.

US8706513: Global investment grade for natural and synthetic gems used in financial investments and commercial trading and method of creating standardized baskets of gems to be used in financial and commercial products

Applicant: GemShares LLC, United States of America
Publication: 2014-04-22
Filed: 2012-06-28
Status: granted

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

US8685360: Method for the production of diamond

Applicant: Kabushiki Kaisya Toyota Jidosyokki, Aichi-ken, Japan
Ehime University, Ehime-ken, Japan
Publication: 2014-04-01
Filed: 2008-02-07
Status: granted

This invention is to provide a method for the production of diamond at a high rate and in a high efficiency using in-liquid plasma. The present invention is a method for the production of diamond using electromagnetic waves irradiated to a liquid containing carbon, hydrogen and oxygen in which the ratio of hydrogen atoms to the sum of carbon atoms and hydrogen atoms is from 0.75 to 0.82 and the ratio of carbon atoms to the sum of carbon atoms and oxygen atoms is from 0.47 to 0.58 so as to generate plasma in the liquid.

US8679443: Method and apparatus for treating diamond using liquid metal saturated with carbon

Applicant: Designed Materials, United Kingdom
Publication: 2014-03-25
Filed: 2010-07-19
Status: granted

A method of treating a diamond, the method comprising: (i) providing a liquid metal saturated with carbon with respect to graphite precipitation; (ii) lowering the temperature of the liquid metal such that the liquid metal is saturated with carbon with respect to diamond precipitation; (iii) immersing a diamond in the liquid metal; and (iv) removing the diamond from the metal.

WO2014061050A1: Automatic sawing machine for cutting stones and materials of irregular shape and different sizes

Applicant: -
Publication: 2014-04-24
Filed: 2013-10-17
Status: application

An automatic sawing machine for cutting stones and materials of irregular shape and different sizes, comprising at least one frame for supporting at least two longitudinal conveyor elements with at least two respective conveyor belts, which are perpendicular one each other, so as to provide a V-shaped channel; the conveyor belts are able to support and to carry one or more stones and/or other similar materials, such as marble, porphyry, granite, etc., from a first input terminal to a second output terminal of the machine and each conveyor belt is also associated with a cutting diamond disk, which is placed parallel to the respective conveyor belt and which is able to cut angular or flat portions of the stones. In particular, the sawing machine has a third longitudinal conveyor element, associated with at least one pressure belt, which is arranged above the cutting diamond disks and which is opposed to said two longitudinal conveyor elements.

WO2014045220A1: Method for surface treatment of single crystals of materials

Applicant: Centre National de la Recherche Scientifique / Universite Paris, France
Publication: 2014-03-27
Filed: 2013-09-19
Status: application

The present invention relates to a method for surface treatment of a single crystal of a material, which enables, after growing on the surface thereof, single crystals of very high quality that have few crystalline defaults to be obtained. The invention also relates to the use of such a method for manufacturing electronic power components, high-energy radiation detectors, synchrotron X-ray monochromators, optoelectronic devices, and efficient electronic devices.

WO2014055041A1: A gemstone tester and a method of characterizing a gemstone
Applicant: Presidium Instruments, Singapore
Publication: 2014-04-10
Filed: 2013-10-03
Status: application

A gemstone tester for characterizing a gemstone and a method of characterizing a gemstone are provided, the gemstone tester comprising a detector unit for detecting one or more transmittances of the gemstone; and a processing unit for determining a first parameter based on one or more of the transmittances of light; and for characterizing the gemstone based on the first parameter; wherein each transmittance of the gemstone is a fraction of light of a specific wavelength that is passed through the gemstone.

JP05362993B2:
Applicant: -
Publication: 2013-12-11
Filed: 2005-12-09
Status: granted

This invention relates to a method of improving the crystalline perfection of IIa diamond crystals by heating the grown diamond crystals at an elevated temperature and an elevated pressure. The invention extends to grown diamond material having a low extended defect density with low nitrogen concentration.

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

The present invention relates to a method for producing colorless, single-crystal diamonds at a rapid growth rate. The method for diamond production includes controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface of the diamond are less than about 20° C., and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface of a diamond at a growth temperature in a deposition chamber having an atmosphere, wherein the atmosphere comprises from about 8% to about 20% CH4 per unit of H2 and from about 5 to about 25% O2 per unit of CH4. The method of the invention can produce diamonds larger than 10 carats. Growth rates using the method of the invention can be greater than 50 μm/hour.

JP2013542906A2:
Applicant: -
Publication: 2013-11-28
Filed: 2010-10-11
Status: application

The present application discloses the details of a microwave plasma chemical vapor deposition process that uses Nitrogen and Diborane simultaneously in combination along with the Methane and Hydrogen gases to grow white color diamonds. The invention embodies using nitrogen to avoid inclusions and impurities in the CVD diamond samples and Diborane for the color enhancement during the growth of diamond. It is also found that heating of the so grown diamonds to 2000 C results in significant color enhancement due to the compensation of Nitrogen and Boron centers in the samples. The origin of the various colors in diamond is explained on the basis of the band diagram of CVD diamond.

JP2013177270A2: Method and apparatus for producing single crystal diamond
Applicant: Kurita Seisakusho
Publication: 2013-09-09
Filed: 2012-02-28
Status: application

Problem to be solved: To provide a method and an apparatus for producing a single crystal diamond using a plasma CVD method capable of maintaining generated plasma stably, and growing a single crystal diamond inexpensively.
Solution: In a method for producing a single crystal diamond making a single crystal diamond grow on a substrate of one electrode by supplying raw material gas and by using plasma generated between electrodes, the position of the plasma is adjusted by a magnetic field formed by a magnetic field generation means. An apparatus for producing a single crystal diamond is also provided.

JP05368634B2:
Applicant: -
Publication: 2013-12-18
Filed: 2010-06-25
Status: granted

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

diamonds are also described.

JP05362992B2:
Applicant: -
Publication: 2013-12-11
Filed: 2004-12-09
Status: granted

In a method of synthesizing 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 pre-treated 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 synthesized 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).

JP2013241658A2: Method and device for synthesizing diamond
Applicant: Institute of National Colleges of Technology, Japan
Publication: 2013-12-05
Filed: 2012-05-22
Status: application

Problem to be solved: To provide a device for synthesizing diamond, capable of synthesizing high quality and highly reliable diamond at a high speed by a device and method which are more inexpensive than the conventional art.
Solution: A device 10 for synthesizing diamond includes: a reactor capable of achieving a vacuum state of 100 Pa or below; a cathode and an anode provided in the reactor; an arc source for generating arc discharge between both electrodes and; and a substrate irradiated with ionized carbon generated from the electrodes. At least one of both electrodes is a carbon source. Accordingly, diamond can be synthesized on the substrate easily and at a high speed without using carbon-containing gas or a carbon-containing liquid.

JP2013189373A2: High color diamond layer
Applicant: Element Six
Publication: 2013-09-26
Filed: 2013-04-24
Status: application

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

JP05344464B2:
Applicant: -
Publication: 2013-11-20
Filed: 2007-04-27
Status: granted

A method for surface treatment of diamond comprising exposing the surface of diamond to UV light containing wavelengths of 172 nm to 184.9 nm and 253.7 nm at an integrated exposure of 10 to 5,000 J/cm2 in an environment of an atmosphere having an oxygen concentration of 20 to 100% and an ozone concentration of 10 to 500,000 ppm to adsorb oxygen on the surface of diamond.

JP2013166677A2: Surface processing method of diamond
Applicant: Kanazawa Univ / National Institute of Advanced Industrial Science & Technology
Publication: 2013-08-29
Filed: 2012-02-16
Status: application

Problem to be solved: To provide a method for simply and safely performing flattening or oxygen termination processing on a diamond surface.
Solution: In the presence of a hydrogen source substance, oxidation processing is performed at a temperature of 300 to 1,200°C. The oxidation processing is performed under conditions where the concentration of O2 in an inert gas is 0.01 to 30% and the concentration of H2O is twice or more the concentration of O2. Furthermore, if the oxidation processing can be performed in the presence of an oxygen source, the oxidation needs not necessarily use oxygen. Heating to a range of 300 to 1,200°C results from considering a reaction time, substantial reaction does not progress at lower than 300°C and in the case of reaction under atmospheric pressure or the like, heating may be performed to a range of 300 to 1,200°C or higher preferably of 400 to 800°C.

JP05294526B2:
Applicant: -
Publication: 2013-09-18
Filed: 2001-04-02

Status: granted

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

JP05294525B2:
Applicant: -
Publication: 2013-09-18
Filed: 2001-04-02
Status: application

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

GB2486782B2: A microwave plasma reactor for manufacturing synthetic diamond material
Applicant: Element Six
Publication: 2014-03-19
Filed: 2011-12-14
Status: granted

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition comprises a microwave generator configured to generate microwaves at a frequency f, a plasma chamber comprising a base, a top plate, and a side wall extending from the base to the top plate defining a resonance cavity for supporting a microwave resonance mode, a microwave coupling configuration for feeding microwaves from the generator into the chamber, a gas flow system for feeding process gases into the chamber and removing them therefrom, and a substrate holder disposed in the chamber. The resonance cavity has a central rotational axis of symmetry extending from the base to the top plate mounted across the axis, a height h from the base to the top plate that supports a TM011 resonant mode at the frequency f, and a diameter d measured at a position less than 50% of the height of the cavity such that a ratio of the height of the cavity to the diameter is in the range 0.3 to 1.0. Also disclosed is a reactor having a resonance cavity that supports a TM011 resonant mode at a frequency in the range 400 to 500, 800 to 100, or 2300 to 2600 MHz, and a method of manufacturing synthetic diamond material using the reactors of the invention.

GB2486781B2: A microwave plasma reactor for manufacturing synthetic diamond material
Applicant: Element Six
Publication: 2014-03-19

Filed: 2011-12-14
Status: granted

A microwave plasma reactor for manufacturing a synthetic diamond material via chemical vapour deposition comprises a plasma chamber, a substrate holder disposed in the chamber, a gas flow system for feeding process gases into the chamber and removing them therefrom, and a microwave coupling configuration for feeding microwaves from a microwave generator into the chamber, the coupling configuration comprising an annular dielectric window formed in one or several sections, a coaxial waveguide having a central inner conductor and an outer conductor, and a waveguide plate comprising a plurality of apertures disposed in an annular configuration with a plurality of arms extending between the apertures, each aperture forming a waveguide for coupling microwaves towards the plasma chamber. The waveguide plate preferably comprises an odd number of apertures, more preferably a prime number, and most preferably 3, 5 or 7. Channels for supplying coolant or process gas may be defined in the plurality of arms. The inner conductor may be a floating conductor supported by a central portion of the waveguide plate. Also disclosed is a method of manufacturing synthetic diamond material using the apparatus of the invention.

AU10222274BB: Methods and systems of imaging cut stones
Applicant: Sarin Color Technologies
Publication: 2014-04-24
Filed: 2010-03-11
Status: granted

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

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Patent News nr. 119 (06-2014)

US8707733: Cut gemstone providing a specific optical pattern
Applicant: -
Publication: 2014-04-29
Filed: 2010-06-09
Status: granted

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

WO2014086889A1: Method for producing synthetic diamonds
Applicant: Cambridge Enterprise, UK
Publication: 2014-06-12
Filed: 2013-12-04
Status: application

A method of producing diamonds comprises the steps of providing a nano-structured carbonaceous material, and thermally treating the nano-structured carbonaceous material in an oxygen-containing environment so as to produce diamonds. The nano-structured carbonaceous material may be materials such as carbon nano-particles, carbon nano-tubes and carbon nano-scrolls. It is preferred that the nano-structured carbonaceous material is created by electrochemical erosion of graphite. Thermal treatment to form the diamonds may occur in a temperature window within which the nano-structured carbonaceous material oxidises but diamond crystals are relatively more stable.

WO2014074612A1: Smooth diamond surfaces and CMP method for forming
Applicant: University of Florida Research Foundation, USA
Publication: 2014-05-15
Filed: 2013-11-06
Status: application

A method of chemical mechanical polishing (CMP) a diamond containing surface includes providing a slurry including a plurality of particles, at least one oxidizer, and at

least one acid, wherein the slurry has a pH ≤ 3 or pH greater than 11. At least an outer surface of the plurality of particles is softer than the diamond surface or the particles are diamond particles averaging less than (<) 2 ¼m in size. The diamond surface is pressed with respect to a polishing pad providing a Shore D Hardness less than 99 having the slurry in between while rotating the polishing pad relative to the diamond surface to form a smooth diamond surface having a root mean square (rms) surface roughness less than 15 nm.

US20140150713A1: Controlling doping of synthetic diamond material

Applicant: Element Six, UK
Publication: 2014-06-05
Filed: 2011-12-14
Status: application

A method of manufacturing synthetic CVD diamond material, the method comprising: providing a microwave plasma reactor comprising: a plasma chamber; one or more substrates disposed in the plasma chamber providing a growth surface area over which the synthetic CVD diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom, injecting process gases into the plasma chamber; feeding microwaves from the microwave generator into the plasma chamber through the microwave coupling configuration to form a plasma above the growth surface area; and growing synthetic CVD diamond material over the growth surface area, wherein the process gases comprise at least one dopant in gaseous form, selected from a one or more of boron, silicon, sulphur, phosphorous, lithium and beryllium at a concentration equal to or greater than 0.01 ppm and/or nitrogen at a concentration equal to or greater than 0.3 ppm, wherein the gas flow system includes a gas inlet comprising one or more gas inlet nozzles disposed opposite the growth surface area and configured to inject process gases towards the growth surface area, and wherein the process gases are injected towards the growth surface area at a total gas flow rate equal to or greater than 500 standard cm3 per minute and/or wherein the process gases are injected into the plasma chamber through the or each gas inlet nozzle with a Reynolds number a Reynolds number in a range 1 to 100.

US20140139608A1: System and method for gemstone microinscription

Applicant: Lazare Kaplan International, New York, USA
Publication: 2014-05-22
Filed: 2012-11-19
Status: application

A gemstone micro-inscription system, comprising an energy source, a spatial light modulator, and a control, the control controlling a spatial light pattern modulation of the spatial light modulator, wherein the spatial light modulator exposes a photoresist on the

gemstone, which selectively impedes an etching process to produce a pattern on the gemstone corresponding to the spatial light modulation pattern.

US8749253: Gem tester
Applicant: Sy Kessler Sales, Dallas, United States of America
Publication: 2014-06-10
Filed: 2013-10-21
Status: granted

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

EP2376681B1: Production of single crystal CVD diamond rapid growth rate
Applicant: Carnegie Institution of Washington, Washington, USA
Publication: 2014-06-11
Filed: 2009-11-24
Status: granted

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 μm/hr. from an atmosphere which is either essentially free of nitrogen or includes a small amount of nitrogen.

US20140119613A1: Automatic gemstone orientation
Applicant: De Beers Centenary Ag, Switzerland
Publication: 2014-05-01
Filed: 2012-04-20
Status: application

A method and apparatus for orientating discrete objects, such as gemstones, is described. The method comprises providing the objects on a travelling path; providing a pair of opposed walls (38) extending generally along the direction of the path; and generating relative oscillatory movement (14) between the pair of walls (38) and the travelling path (in a direction generally transverse to the direction of the path), so that the pair of walls (38) imparts lateral force to the objects to thereby urge them into their most stable

orientation as they progress along the path. A device for checking the orientation of the discrete objects is also described.

US8744188: Gem pattern matching algorithm to determine the percentage match of a target gem pattern to a database of gem patterns
Applicant: Gemological Appraisal Association, New York, USA
Publication: 2014-06-03
Filed: 2012-08-16
Status: granted

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

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

To provide a diamond cut evaluate program and a diamond cut evaluate method for outputting an objective reference to a cut evaluation by digitizing and visualizing a cut (shape) being one of four factors when evaluating a diamond as a jewelry.

US8724217: Reflected dark field method and apparatus
Applicant: Gemological Institute of America, (GIA), Carlsbad, USA
Publication: 2014-05-13
Filed: 2012-10-12
Status: granted

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

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

GB2508072A: Single crystal chemical vapour deposited synthetic diamond materials having uniform colour

Applicant: Element Six, UK
Publication: 2014-05-21
Filed: 2013-09-13
Status: application

A coloured single crystal CVD synthetic diamond material comprises: a plurality of layers, wherein the plurality of layers includes at least two sets of layers which differ in terms of their defect composition and colour, wherein defect type, defect concentration, and layer thickness for each of the at least two sets of layers is such that if the coloured single crystal CVD diamond material is fabricated into a round brilliant cut diamond comprising a table and a culet, and having a table to culet depth greater than 1 mm, the round brilliant cut diamond comprises a uniform colour as viewed by naked human eye under standard ambient viewing conditions in at least a direction through the table to the culet. Two sets of layers may comprise a first set of layers comprising boron dopant at a concentration sufficient to produce a blue colouration and a second set of layers comprising a lower concentration of boron dopant. A method of fabricating the synthetic diamond material is also disclosed.

GB2492661B2: Single crystal diamond substrates for synthesis of single crystal diamond material

Applicant: Element Six, UK
Publication: 2014-05-21
Filed: 2012-07-05
Status: granted

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

"State of the art" mailing service

Patent News nr. 120 (07/10-2014)

US8707733: Cut gemstone providing a specific optical pattern
Applicant: Ehlement Siks Ltd
Publication: 2014-05-20
Filed: 2010-12-15
Status: granted

FIELD: chemistry.SUBSTANCE: invention relates to technology of production of synthetic diamond material, which can be applied in electronic devices. Diamond material contains single substituting nitrogenin concentration more than 0.5 ppm and having such complete integral absorption in visible area from 350 nm to 750 nm, that at least nearly 35% of absorption is attributed toDiamond material is obtained by chemical deposition from vapour or gas phase (CVD) on substrate in synthesis medium, which contains nitrogen in atomic concentration from nearly 0.4 ppm to nearly 50 ppm, and gas-source contains: atomic part of hydrogen, Hfrom nearly 0.40 to nearly 0.75, atom part of carbon, C, from nearly 0.15 to nearly 0.30; atomic part of oxygen, O, from nearly -.13 to nearly 0.40; and H+C+O=1; ratio of atomic part of carbon to atomic part of oxygen, C:O, satisfy the ratio nearly 0.45:1<C:O< nearly 1.25:1; and gas-source contains atoms of hydrogen, added in form of hydrogen molecules, H, with atomic part of the total quantity of present atoms of hydrogen, oxygen and carbon between 0.05 and 0.40; and atomic parts of H, Cand Orepresent parts from the total quantity of atoms of hydrogen, oxygen and carbon, present in gas-source.EFFECT: invention makes it possible to obtain diamond material with rather high content of nitrogen, which is evenly distributed, and which is free of other defects, which provides its electronic properties.17 cl, 11 dwg, 6 ex

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FR2986404B1: Dispositif d'ornementation comportant au moins une pierre
Applicant: Orepa
Publication: 2014-10-03
Filed: 2012-02-06
Status: granted

Ornamental device for use in e.g. jewelry field, has inner volume that is defined between rear portion of stone and protection unit, and attaching unit attaching protection unit to stone for protection of rear portion of stone

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DE102013005031A1: Verfahren zum Versehen von Schmuckedelsteinen mit einer Kennung und mit einer solchen Kennung versehener Schmuckedelstein

Applicant: Leico Leiser AG
Publication: 2014-09-25
Filed: 2013-03-25
Status: application

Method for identifying precious stone i.e. diamond, in jewelry, involves identifying residual particle from precious stone using grinding identification process, and forming pane of precious stone and part of keel by particle in jewelry

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WO2014131293A1: 81-Facet diamond with 10-heart-and-10-arrow structure inside

Applicant: Zhang Kunzhi, Zhang Feng China
Publication: 2014-09-04
Filed: 2011-12-14
Status: application

The present invention relates to an 81-facet diamond with a 10-heart-and-10-arrow structure inside. The diamond comprises 10 main crown facets and 10 main pavilion facets. The diamond further comprises one table facet. Crown star facets are disposed at places where the main crown facets are connected to the table facet, and the number of the crown star facets is 10. Crown small facets are disposed at places wherein main crown facet edges are connected to the crown star facets, and the number of the crown small facets is 10. Small sector facets are disposed at places where the main crown facets are connected to the crown small facets, and the number of the small sector facets is 20. Auxiliary facets of the main pavilion facets are disposed at main pavilion facet connection places, and the number of the auxiliary facets of the main pavilion facets is 20. The present invention has the following beneficial effects: the diamond is cut into 81 facets, and a 10-heart-and-10-arrow structure is provided inside, higher quality and value are provided for the diamond by using a high-end cutting process, and the brightness of the diamond under sunshine is increased by 20 to 30%. The diamond according to the present invention has a higher brilliant degree.

EP2412266B1: Multi-faceted gemstone for multi-stone jewelry item

Applicant: Firestar Diamond Inc, USA
Publication: 2014-10-15
Filed: 2010-12-27
Status: granted

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

US20140290638A1: Gemstone and method for cutting the same
Applicant: Dimexon Diamonds, IN
Publication: 2014-10-02
Filed: 2014-06-13
Status: application

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

US8834177B2: Computer-implemented method of and system for teaching an untrained observer to evaluate a gemstone
Applicant: Sarine Color Technologie, IL; Lapa Davy, BE Lenaerts Christian, BE
Publication: 2014-09-16
Filed: 2012-09-14
Status: granted

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

US8813519B2: Modified princess cut diamond having hearts and arrows pattern and method
Applicant: Worldwide Diamonds, BC; Rydlewicz Roni, BE
Publication: 2014-08-26
Filed: 2011-08-08
Status: reexamination certificate second reexamination

A modified princess cut diamond and method of forming a modified princess cut diamond into a symmetrical shape possessing a hearts and arrows pattern characteristic of the true hearts and arrows pattern in a round cut diamond. The modified princess cut diamond includes: a tablet facet, 4 main crown facets, 8 crown halves, 8 crown star

facets, 4 subsidiary crown facets, 8 subsidiary crown halves, 8 main pavilion facets, 4, subsidiary pavilion facets, 16 pavilion halves and a girdle with each main crown facet having a pair of crown star facets symmetrically disposed on one side thereof adjacent to the tablet facet and a pair of crown halves symmetrically disposed on the opposite sides thereof with each pair of crown star facets having the side thereof adjoining the table facet meeting at a point equal to essentially half the longer distance of the main crown facet measured horizontally and with all crown star facets and crown halves adjacent each main crown having identical polished angles with a maximum tolerance of 0.30.

EP2752506A1: Single-crystal diamond and manufacturing method thereof
Applicant: Sumitomo Electric Industries
Publication: 2014-07-09
Filed: 2012-08-30
Status: application

Single-crystal diamond is composed of carbon in which a concentration of a carbon isotope 12C is not lower than 99.9 mass % and a plurality of inevitable impurities other than carbon. The inevitable impurities include nitrogen, boron, hydrogen, and nickel, and a total content of nitrogen, boron, and hydrogen of the plurality of inevitable impurities is not higher than 0.01 mass %. In order to manufacture single-crystal diamond, initially, a hydrocarbon gas in which a concentration of the carbon isotope 12C is not lower than 99.9 mass % is subjected to denitrification. A carbon source material obtained by thermal decomposition of the hydrocarbon gas subjected to denitrification on a base material in a vacuum chamber, for example, at a temperature not lower than 1200°C and not higher than 2300°C is prepared, diamond is synthesized from the carbon source material, and a seed crystal is cut from the diamond. While this seed crystal is accommodated in a cell together with a solvent and a carbon source, single-crystal diamond is grown from the seed crystal with a high-temperature and high-pressure synthesis method.

EP2794945A1: Single-crystal diamond and manufacturing method thereof
Applicant: Ikeda Kazuhiro
Publication: 2014-08-07
Filed: 2014-02-27
Status: application

Single-crystal diamond is composed of carbon in which a concentration of a carbon isotope 12C is not lower than 99.9 mass % and a plurality of inevitable impurities other than carbon. The inevitable impurities include nitrogen, boron, hydrogen, and nickel, and a total content of nitrogen, boron, and hydrogen of the plurality of inevitable impurities is not higher than 0.01 mass %. In order to manufacture single-crystal diamond, initially, a hydrocarbon gas in which a concentration of the carbon isotope 12C is not lower than 99.9 mass % is subjected to denitrification

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US20140279337A1: Systems and methods for bundling diamonds into valued groupings
Applicant: Rapaport Martin
Publication: 2014-09-18
Filed: 2013-03-12
Status: application

This disclosure relates to systems for bundling diamonds and determining a relative value of the diamonds within the bundle and the value of the bundle. Also described are methods for using the determined relative diamond values in diamond transactions and contracts

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WO2014141242A1: Systems and methods for bundling diamonds into valued groupings
Applicant: Rapaport Martin
Publication: 2014-09-18
Filed: 2014-03-10
Status: application

This disclosure relates to systems for bundling diamonds and determining a relative value of the diamonds within the bundle and the value of the bundle. Also described are methods for using the determined relative diamond values in diamond transactions and contracts

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CA2607202C: High colour diamond layer
Applicant: Element Six
Publication: 2014-06-03
Filed: 2006-06-22
Status: granted

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

EP2791399A1: Single crystal cvd synthetic diamond material
Applicant: Element Six Technologies Ltd
Publication: 2014-10-22
Filed: 2012-12-12
Status: application

A single crystal CVD synthetic diamond material comprising: a total as-grown nitrogen concentration equal to or greater than 5 ppm, and a uniform distribution of defects, wherein said uniform distribution of defects is defined by one or more of the following characteristics: (i) the total nitrogen concentration, when mapped by secondary ion mass spectrometry (SIMS) over an area equal to or greater than 50 x 50 μm using an analysis area of 10 μm or less, possesses a point-to-point variation of less than 30% of an average total nitrogen concentration value, or when mapped by SIMS over an area equal to or greater than 200 x 200 μm using an analysis area of 60 μιη or less, possesses a point-to-point variation of less than 30% of an average total nitrogen concentration value; (ii) an as-grown nitrogen-vacancy defect (NV) concentration equal to or greater than 50 ppb as measured using 77K UV-visible absorption measurements, wherein the nitrogen-vacancy defects are uniformly distributed through the synthetic single crystal CVD diamond material such that, when excited using a 514 nm laser excitation source of spot size equal to or less than 10 μιη at room temperature using a 50 mW continuous wave laser, and mapped over an area equal to or greater than 50 x 50 μm with a data interval less than 10 μιη, there is a low point-to-point variation wherein the intensity area ratio of nitrogen vacancy photoluminescence peaks between regions of high photoluminescent intensity and regions of low photolominescent intensity is <2x for either the 575 nm photoluminescent peak (NV0) or the 637 nm photoluminescent peak (NV); (iii) a variation in Raman intensity such that, when excited using a 514 nm laser excitation source (resulting in a Raman peak at 552.4 nm) of spot size equal to or less than 10 μm at room temperature using a 50 mW continuous wave laser, and mapped over an area equal to or greater than 50 x 50 μm with a data interval less than 10 μm, there is a low point-to-point variation wherein the ratio of Raman peak areas between regions of low Raman intensity and high Raman intensity is <1.25x; (iv) an as-grown nitrogen-vacancy defect (NV) concentration equal to or greater than 50 ppb as measured using 77K UV-visible absorption measurements, wherein, when excited using a 514 nm excitation source of spot size equal to or less than 10 μm at 77K using a 50 mW continuous wave laser, gives an intensity at 575 nm corresponding to NV0 greater than 120 times a Raman intensity at 552.4 nm, and/or an intensity at 637 nm corresponding to NV- greater than 200 times the Raman intensity at 552.4 nm; (v) a single substitutional nitrogen defect (Ns) concentration equal to or greater than 5 ppm, wherein the single substitutional nitrogen defects are uniformly distributed through the synthetic single crystal CVD diamond material such that by using a 1344 cm-1 infrared absorption feature and sampling an area greater than an area of 0.5 mm2, the variation is lower than 80%, as deduced by dividing the standard deviation by the mean value; (vi) a variation in red luminescence intensity, as defined by a standard deviation divided by a mean value, is less than 15%; (vii) a mean standard deviation in neutral single substitutional nitrogen concentration of less than 80%; and (viii) a colour intensity as measured using a histogram from a microscopy image with a mean gray value of greater than 50, wherein the colour intensity is uniform through the single crystal CVD synthetic diamond material such that the variation in gray colour, as characterised by the gray value standard deviation divided by the gray value mean, is less than 40%

CA2765901C: Diamond material

Applicant: Element Six Ltd
Publication: 2014-08-12
Filed: 2010-06-25
Status: granted

Starting from a diamond material which shows a difference in its absorption characteristics after exposure to radiation with an energy of at least 5.5 eV (typically UV radiation) and thermal treatment at 798K, controlled irradiation is applied so as to introduce defects in the diamond material. After the controlled irradiation the difference in the absorption characteristics after exposure to radiation with an energy of at least 5.5 eV and thermal treatment at 798K is reduced. Diamond material with absorption features characteristic of isolated vacancies is also described

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WO2014141282A1: Methods for evaluating gemstone shape
Applicant: Rapaport 2012 Family Trust
Publication: 2014-09-18
Filed: 2014-03-13
Status: application

This disclosure relates to methods of evaluating the shape of a gemstone, such as a diamond, ruby, emerald, or sapphire. Also provided are methods of identifying gemstone shape

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EP1565598B1: Optical quality cvd diamond material and method for its production
Applicant: Element Six Technologies Ltd
Publication: 2014-10-15
Filed: 2003-11-20
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

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CA2765804C: Method for making fancy orange coloured single crystal cvd diamond and product obtained
Applicant: Element Six Ltd
Publication: 2014-10-22
Filed: 2012-12-13
Status: granted

A method of making fancy orange synthetic CVD diamond material is described. The method comprises irradiating a single crystal diamond material that has been grown by CVD to introduce isolated vacancies into at least part of the CVD diamond material and then annealing the irradiated diamond material to form vacancy chains from at least some of the introduced isolated vacancies. Fancy orange CVD diamond material is also described

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GB2508072A: Single crystal chemical vapour deposited synthetic diamond materials having uniform colour

Applicant: Element Six Ltd
Publication: 2014-05-21
Filed: 2013-09-18
Status: application

Single crystal chemical vapour deposited synthetic diamond materials having uniform colour. A coloured single crystal CVD synthetic diamond material comprises: a plurality of layers, wherein the plurality of layers includes at least two sets of layers which differ in terms of their defect composition and colour, wherein defect type, defect concentration, and layer thickness for each of the at least two sets of layers is such that if the coloured single crystal CVD diamond material is fabricated into a round brilliant cut diamond comprising a table and a culet, and having a table to culet depth greater than 1 mm, the round brilliant cut diamond comprises a uniform colour as viewed by naked human eye under standard ambient viewing conditions in at least a direction through the table to the culet. Two sets of layers may comprise a first set of layers comprising boron dopant at a concentration sufficient to produce a blue colouration and a second set of layers comprising a lower concentration of boron dopant. A method of fabricating the synthetic diamond material is also disclosed

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GB2510269A: Microwave plasma reactors and substrates for synthetic diamond manufacture

Applicant: Element Six Ltd
Publication: 2014-07-30
Filed: 2011-12-14
Status: application

A substrate 400, 402, 404, 406 comprises a cylindrical disc of a carbide forming refractory metal (e.g. Mo, W, Nb, or alloys thereof) having a flat growth surface on which CVD diamond is to be grown and a flat supporting surface opposed to the growth surface, wherein the disc has a diameter of at least 80mm, and the growth surface and supporting surface both have a flatness variation of no more than 100 μm, preferably no more than 1 μm. Preferably the surface roughness of the growth surface is in the range 1 nm to 1 μm, most preferably 50 nm to 100 nm. The edge of the substrate around the growth surface may be sharp, chamfered (fig 8b) or rounded. A circular trench may be provided in the growth surface. A method of manufacturing a synthetic diamond material

using a CVD process is also disclosed. The diamond material may be a polycrystalline diamond wafer which is spontaneously delaminated from the substrate on cooling. A microwave plasma reactor for manufacturing synthetic diamond material is also disclosed

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US8859058B2: Microwave plasma reactors and substrates for synthetic diamond manufacture

Applicant: Dodge Carlton Nigel
Publication: 2014-10-14
Filed: 2013-11-14
Status: Reexamination Certificate Second Reexamination

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

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US20140297368A1: System and method for determining the market price for an individual diamond

Applicant: Ferder Mordechai Haim
Publication: 2014-10-02
Filed: 2013-04-02
Status: application

A diamond appraisal system and method is described that allows a user select a diamond to be appraised. Based on characteristics of the appraisal diamond, comparison diamonds are selected from one or more market databases. The comparison diamonds are associated with historical or current actual market prices, which reflect actual sale prices or proposed sale prices for each of the comparison diamonds. Premium and discount weights are applied to these actual market prices to generate an estimated market price

for the appraisal diamond. By computing the estimated market price of the appraisal diamond relative to the actual market prices of other diamonds, the diamond appraisal system and method determines the monetary value of the appraisal diamond relative to changing market conditions

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US20140220261A1: Microwave plasma reactors
Applicant: Asmussen Jes
Publication: 2014-08-07
Filed: 2013-11-13
Status: application

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

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CA2548449C: Method of incorporating a mark in CVD Diamond
Applicant: Element Six Ltd
Publication: 2014-06-03
Filed: 2004-12-10
Status: granted

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

US20140150713A1: Controlling doping of synthetic diamond material
Applicant: Wilman Helen
Publication: 2014-06-05

Filed: 2013-12-19
Status: application

A method of manufacturing synthetic CVD diamond material, the method comprising: providing a microwave plasma reactor comprising: a plasma chamber; one or more substrates disposed in the plasma chamber providing a growth surface area over which the synthetic CVD diamond material is to be deposited in use; a microwave coupling configuration for feeding microwaves from a microwave generator into the plasma chamber; and a gas flow system for feeding process gases into the plasma chamber and removing them therefrom, injecting process gases into the plasma chamber; feeding microwaves from the microwave generator into the plasma chamber through the microwave coupling configuration to form a plasma above the growth surface area; and growing synthetic CVD diamond material over the growth surface area, wherein the process gases comprise at least one dopant in gaseous form, selected from a one or more of boron, silicon, sulphur, phosphorous, lithium and beryllium at a concentration equal to or greater than 0.01 ppm and/or nitrogen at a concentration equal to or greater than 0.3 ppm, wherein the gas flow system includes a gas inlet comprising one or more gas inlet nozzles disposed opposite the growth surface area and configured to inject process gases towards the growth surface area, and wherein the process gases are injected towards the growth surface area at a total gas flow rate equal to or greater than 500 standard cm3 per minute and/or wherein the process gases are injected into the plasma chamber through the or each gas inlet nozzle with a Reynolds number a Reynolds number in a range 1 to 100

WO2014160110A1: Standard diamond parcel certification for exchange traded funds
Applicant: Rosy Blue DMCC
Publication: 2014-10-02
Filed: 2014-03-13
Status: application

Standard Diamond Parcels (SDPs) are certified for use in Exchange Traded Funds (ETFs). Three SDP colour types, Luxury, Premium and Privilege along with seven weight ranges simplify the complexity of diamond trading into twenty one different types of SDPs. Each SDP has ten diamonds, each diamond having a different colour / clarity combination. An SDP certification device, method and durable, non-transitory computer readable storage medium assures the characteristic of the diamonds in of each SDP type have a uniform valuation even though characteristics of the individual diamonds in each SDP may vary. One or more SDP may be grouped for use in an EFT unit

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US20140292358A1: Gem tester
Applicant: Sy Kessler Sales Inc
Publication: 2014-10-02
Filed: 2014-06-10
Status: application

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

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US20140279338A1: Standard diamond parcel certification for exchange traded funds

Applicant: Rosy Blue DMCC
Publication: 2014-09-18
Filed: 2013-03-13
Status: application

Standard Diamond Parcels (SDPs) are certified for use in Exchange Traded Funds (ETFs). Three SDP colour types, Luxury, Premium and Privilege along with seven weight ranges simplify the complexity of diamond trading into twenty one different types of SDPs. Each SDP has ten diamonds, each diamond having a different colour/clarity combination. An SDP certification device, method and durable, non-transitory computer readable storage medium assures the characteristic of the diamonds in of each SDP type have a uniform valuation even though characteristics of the individual diamonds in each SDP may vary. One or more SDP may be grouped for use in an EFT unit

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GB2508993A: Microwave plasma CVD synthetic diamond growth on non-planar and/or non-refractory substrates

Applicant: Element Six Ltd
Publication: 2014-06-18
Filed: 2013-12-04
Status: application

Microwave Plasma CVD Synthetic Diamond Growth On Non-Planar And/Or Non-Refractory Substrates
A method of coating a non-refractory and/or non-planar substrate with synthetic diamond material using a microwave plasma chemical vapour deposition (MWCVD) synthesis technique is described. The method details forming a composite substrate assembly comprising: a support substrate with an upper surface 4 and one or more electrically conductive refractory guards disposed over the upper surface of the support substrate, extending to a height hg above the upper surface of the support substrate; and one or more non-refractory and/or non-planar substrates disposed over the upper surface of the support substrate, wherein the height hs above the upper surface of the support substrate, where the height hs and where the difference in height hg –hs lies in the range of 0.2-10mm. The composite substrate assembly is located within a plasma chamber of the

microwave plasma CVD reactor. The process gases are fed into the plasma chamber with microwave plasma where plasma is formed at a location over the composite substrate assembly thus growing synthetic diamond on the one or more non-refractory and/or non-planar substrates

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WO2014090664A1: Method for making diamond layers by CVD
Applicant: Element Six Technologies LTD
Publication: 2014-06-19
Filed: 2013-12-04
Status: application

A method of coating a non-refractory and/or non-planar substrate (8) with synthetic diamond material using a microwave plasma chemical vapour deposition (CVD) synthesis technique, the method comprising: • forming a composite substrate assembly (1) comprising: • a support substrate (2) comprising an upper surface; • one or more electrically conductive refractory guards (6) disposed over the upper surface of the support substrate and extending to a height hg above the upper surface of the support substrate; and one or more non-refractory and/or non-planar substrates disposed over the upper surface of the support substrate and extending to a height hs above the upper surface of the support substrate, wherein the height hs is less than the height hg, wherein a difference in height hg - hs lies in a range 0.2 mm to 10 mm; • placing the composite substrate assembly within a plasma chamber of a microwave plasma CVD reactor; • feeding process gases into the plasma chamber including a carbon containing gas and a hydrogen containing gas; • feeding microwaves in the plasma chamber to form a microwave plasma at a location over the composite substrate assembly; and • growing synthetic diamond material on the one or more non-refractory and/or non-planar substrates

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US8760758B2: Reflected dark field method and apparatus
Applicant: Gemological Inst America Inc
Publication: 2014-06-24
Filed: 2012-10-12
Status: Reexamination Certificate Second Reexamination

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

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

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CA2805441A1: Modified princess cut diamond having hearts and arrows pattern and method

Applicant: Worldwide Diamond Trademarks
Publication: 2014-07-23
Filed: 2013-02-08
Status: application

A modified princess cut diamond and method of forming a modified princess cut diamond into a symmetrical shape possessing a hearts and arrows pattern characteristic of the true hearts and arrows pattern in a round cut diamond. The modified princess cut diamond includes: a tablet facet, 4 main crown facets, 8 crown halves, 8 crown star facets, 4 subsidiary crown facets, 8 subsidiary crown halves, 8 main pavilion facets, 4, subsidiary pavilion facets, 16 pavilion halves and a girdle with each main crown facet having a pair of crown star facets symmetrically disposed on one side thereof adjacent to the tablet facet and a pair of crown halves symmetrically disposed on the opposite sides thereof with each pair of crown star facets having the side thereof adjoining the table facet meeting at a point equal to essentially half the longer distance of the main crown facet measured horizontally and with all crown star facets and crown halves adjacent each main crown having identical polished angles with a maximum tolerance of 0.30 .

US20140283874A1: Jewellery cleaning wipe

Applicant: Coxon Andrew
Publication: 2014-09-25
Filed: 2014-03-14
Status: application

It is surprisingly found that when diamond particles are embedded into an alcohol wipe, the cleansing wipe that is formed is extremely useful at cleaning diamond jewellery in the home. It is also surprising that, given the abrasive nature of diamond, the diamond particles result in a satisfactory clean without causing any damage to the surface of the diamond being cleaned. The final result is that the cleaned diamond has recovered most of its original fire, life and brilliance

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US20140230729A1: Microwave plasma reactor for manufacturing synthetic diamond material

Applicant: Element Six Ltd
Publication: 2014-08-21
Filed: 2014-04-25
Status: application

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a microwave generator configured to generate microwaves at a frequency f; a plasma chamber comprising a base, a top plate, and a side wall extending from said base to said top plate defining a resonance cavity for supporting a microwave resonance mode, wherein the resonance cavity has a central rotational axis of symmetry extending from the base to the top plate, and wherein the top plate is mounted across said central rotational axis of symmetry; a microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber; a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; and a substrate holder disposed in the plasma chamber and comprising a supporting surface for supporting a substrate on which the synthetic diamond material is to be deposited in use; wherein the resonance cavity is configured to have a height, as measured from the base to the top plate of the plasma chamber, which supports a TM011 resonant mode between the base and the top plate at said frequency f, and wherein the resonance cavity is further configured to have a diameter, as measured at a height less than 50% of the height of the resonance cavity as measured from the base, which satisfies the condition that a ratio of the resonance cavity height/the resonance cavity diameter is in the range 0.3 to 1.0

WO2014086889A1: Method for producing synthetic diamonds
Applicant: Cambridge Entpr Ltd
Publication: 2014-06-12
Filed: 2013-12-04
Status: application

A method of producing diamonds comprises the steps of providing a nano-structured carbonaceous material, and thermally treating the nano-structured carbonaceous material in an oxygen-containing environment so as to produce diamonds. The nano-structured carbonaceous material may be materials such as carbon nano-particles, carbon nano-tubes and carbon nano-scrolls. It is preferred that the nano-structured carbonaceous material is created by electrochemical erosion of graphite. Thermal treatment to form the diamonds may occur in a temperature window within which the nano-structured carbonaceous material oxidises but diamond crystals are relatively more stable

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WO2014147407A1: Jewellery cleaning wipe
Applicant: For Your Diamonds Only Ltd
Publication: 2014-09-25
Filed: 2014-03-20
Status: application

A cleansing wipe comprises a substrate and, absorbed therein, a suspension of an alcohol solution and diamond particles with a median equivalent volumetric diameter (Dv50) of less than 40 μηι. Also provided are packages comprising a wipe as defined above, and a

method of cleaning a diamond item using the wipes of the invention

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AU2013234309A1: Sorting aggregate material
Applicant: De Beers Centenary AG
Publication: 2014-08-21
Filed: 2013-03-14
Status: application

A sorting apparatus for classifying candidate rough gemstones in aggregate material, the apparatus comprising: a transport system for individually transporting a stone from the aggregate material to at least one measurement location; a measurement system configured to determine, at the at least one measurement location, one or more of: whether the stone comprises diamond material, whether the stone comprises boart, and the shape of the stone; the apparatus further comprising a dispenser system configured to dispense the stone from the transport system to one of a plurality of locations in dependence on the determination of the measuring system

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US8826854B2: Direct-current plasma CVD apparatus and method for producing diamond using the same
Applicant: Noguchi Hitoshi
Publication: 2014-09-09
Filed: 2010-01-04
Status: granted

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

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KR1454569B1: A microwave plasma reactor for manufacturing synthetic diamond material
Applicant: Element Six Limited
Publication: 2014-10-23
Filed: 2011-12-14
Status: granted

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

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EP2656375B1: A microwave plasma reactor for manufacturing synthetic diamond material

Applicant: Element Six Technologies Ltd
Publication: 2014-10-08
Filed: 2011-12-14
Status: granted

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

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US20140195442A1: Combination retailing system for appraising precious stones and metals and dispensing gift cards, coupons and the like

Applicant: Ward Kraft Inc
Publication: 2014-07-10
Filed: 2014-03-13
Status: application

A system for appraising an item physically received from a seller includes a transaction point computer. The item has at least one constituent selected from the group consisting of a precious stone, a semi-precious stone, a precious metal, and a semi-precious metal.

Appraising the item includes determining a composition of the item using an evaluating device and associating an exchange value with the item using the evaluating device and market data obtained over a network. The system includes a networking device and shipping carton dispenser configured to provide a shipping carton for shipping the item to a depository. The system further includes a shipping label dispenser for providing a fold-under label to be adhered to the shipping carton, and a slot for dispensing a transaction card to the seller. The shipping carton is shipped to the depository after the transaction card is loaded with the exchange value

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US20140195377A1: Combination retailing system for appraising precious stones and metals and dispensing gift cards, coupons and the like
Applicant: Ward Kraft Inc
Publication: 2014-07-10
Filed: 2014-03-13
Status: application

A computer implemented method for appraising and selling an item includes the step of using a kiosk to physically receive the item from a seller. The method comprises the step of appraising the item by determining a composition of the item using an evaluating device and associating an exchange value with the item using market data obtained over a network. A global positioning device determines a location of the kiosk. The method includes the step of using a legal database to ascertain a set of rules governing the sale of the item in the location. The set of rules comprise a holding requirement dictating that the item be retained for a fixed number of days before it is sold to a buyer. The method also includes the step of selling the item to the buyer at the kiosk in compliance with the set of rules

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JP05362993B2: -
Applicant: Element Six Technologies Pty Ltd
Publication: 2013-12-11
Filed: 2005-12-09
Status: granted

This invention relates to a method of improving the crystalline perfection of IIa diamond crystals by heating the grown diamond crystals at an elevated temperature and an elevated pressure. The invention extends to grown diamond material having a low extended defect density with low nitrogen concentration

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JP05443022B2: -
Applicant: Rosy Blue
Publication: 2014-03-19
Filed: 2009-03-04
Status: granted

Diamond and artificial gems for use in accessories, has heart pattern which is visually recognized between arrow patterns

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JP2014034473A: Method for producing diamond and direct current plasma cvd apparatus

Applicant: Shinetsu Chemical Co
Publication: 2014-02-24
Filed: 2012-08-07
Status: application

Problem to be solved: To provide a method for producing a diamond that may maintain a stable growth rate of the diamond and produces a high quality diamond
Solution: A method for producing a diamond is provided in which the diamond is grown on a substrate S using a mixed gas of a carbon-containing gas and a hydrogen gas as a raw material by a direct current plasma CVD method applying a DC voltage between a stage electrode 12 holding the substrate S and a voltage application electrode. A single pulse voltage having reverse polarity to the polarity of the DC voltage for growing the diamond is applied between the stage electrode and the voltage application electrode 13 at a specific timing while the diamond is grown by applying the DC current for growing the diamond

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JP2014133099A: Heart shaped diamond cut having hearts and arrows pattern

Applicant: Sundiamond Usa Corp
Publication: 2014-07-24
Filed: 2013-12-05
Status: application

Problem to be solved: To provide a heart shaped diamond having main crown facets for generating a hearts and arrows pattern characteristic when exposed to light comparable to the hearts and arrows pattern generated by an ideal round cut diamond
Solution: A heart shaped diamond comprises: 8 main crown facets symmetrically aligned relative to one another; 8 main pavilion facets aligned at a fixed given angle of approximately 45° to each other and converging at a common point corresponding to the center of the diamond; 16 pavilion half facets aligned at 22.5° with respect to each other; a girdle which is non-uniform; a table facet; and a multiple number of crown star facets in an arrangement surrounding the table facet. Each of the 8 main crown facets has a straight edge aligned in parallel with a straight edge of another main crown facet disposed opposite thereto

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JP2013241658A: Method and device for synthesizing diamond

Applicant: Inst Nat Colleges Tech Japan
Publication: 2013-12-05

Filed: 2012-05-22
Status: application

Problem to be solved: To provide a device for synthesizing diamond, capable of synthesizing high quality and highly reliable diamond at a high speed by a device and method which are more inexpensive than the conventional art
Solution: A device for synthesizing diamond includes: a reactor capable of achieving a vacuum state of 100 Pa or below; a cathode and an anode provided in the reactor; an arc source for generating arc discharge between both electrodes; and a substrate irradiated with ionized carbon generated from the electrodes. At least one of both electrodes is a carbon source. Accordingly, diamond can be synthesized on the substrate easily and at a high speed without using carbon-containing gas or a carbon-containing liquid

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JP2014139134A: CVD single crystal diamond material
Applicant: Element Six Ltd
Publication: 2014-07-31
Filed: 2014-03-20
Status: application

PROBLEM TO BE SOLVED: To provide a single crystal CVD diamond material having a reduced point defect density, a reduced dislocation density and an increased internal dimension, and suitable for an application having a high demand level such as a Raman scattering medium in a Raman laser, and to provide a production method thereof
SOLUTION: A CVD single crystal diamond material has an absorption coefficient below 0.010 cm-1 which is determined along an internal route exceeding 7 mm, and determined with birefringence below 1×10-5 and a wavelength of 1,064 nm, by using a light beam having the longest length internal dimension exceeding 7 mm and a cross sectional area exceeding 0.01 mm2, when being measured at room temperature. A production method of a CVD single crystal diamond has a plurality of growth stages classified by changing a nitrogen concentration in a gas phase in a CVD reactor

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JP2014031306A: Method of forming identification mark on single crystal substrate made of refractory material, and single crystal substrate made of refractory material
Applicant: Hitachi Metals Ltd
Publication: 2014-02-20
Filed: 2013-06-10
Status: application

Problem to be solved: To provide a method of forming an identification mark of high visibility on a single crystal substrate made of a refractory material
Solution: A single crystal substrate made of a refractory material is composed of a single crystal and constituted of one substance selected from the group consisting of sapphire, gallium nitride, aluminum nitride, diamond, boron nitride, zinc oxide, gallium oxide, and titanium dioxide. A method of forming an identification mark on the single crystal

substrate made of a refractory material comprises: a step (a) of scanning the principal plane of the single crystal substrate made of a refractory material with a laser beam of a first energy density to form a groove, and of forming the identification mark composed of one or more grooves on the principal plane of the single crystal substrate made of a refractory material; and a step (b) of scanning the inside of the grooves formed on the principal plane of the single crystal substrate made of a refractory material with the laser beam of a second energy density lower than the first energy density

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USD715179S1: Multiple facet gemstone

Applicant: Rosy Blue
Publication: 2014-10-14
Filed: 2014-04-22
Status: granted

"State of the art" mailing service

Patent News nr. 121 (11/12-2014)

CA2686339C: Heart shaped diamond cut having hearts and arrows pattern
Applicant: Worldwide Diamond Trademarks Ltd
Publication: 2014-12-09
Filed: 2008-04-22
Status: granted

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

EP2524616B1: Gemstone of natural diamond and method applied thereto
Applicant: Diamond Trading NV
Publication: 2014-12-10
Filed: 2012-02-17
Status: granted

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

WO2014184508A1: Method for processing a diamond material work-piece
Applicant: Irving Andrew David
Publication: 2014-11-20
Filed: 2014-05-03
Status: application

A method for processing diamond material to change its physical appearance. The diamond is brought into contact with the surface of one or more copper machining part. This assembly is heated in an atmosphere that contains oxygen to thermo-chemically

remove carbon from the diamond. The atmosphere contains a reducing agent to control the growth of copper oxide on the machining parts by reducing the copper oxide to copper. Carbon atoms are removed at the interaction region where the surface of the diamond makes contact with the copper on the surfaces of one or more machining part. The rate of carbon removal follows an Arrhenius temperature equation. The diamond and/or the machining parts are moved relative to each other, where each component of the relative speed is less than the material removal rate to thereby remove material thereby shaping the diamond as specified

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GB2514105A: System and method for processing a diamond material work-piece
Applicant: Irving Andrew David
Publication: 2014-11-19
Filed: 2013-05-12
Status: application

Systems and methods for processing the surface of diamond articles
A method for processing a surface of a diamond article to remove carbon atoms by a redox reaction with copper oxide molecules on a surface of one or more machining parts to thermo-chemically machine the article into an artefact according to a specification comprises the steps of providing a diamond article, providing one or more machining parts having a surface made substantially of copper, providing a specification, fixing or placing the article and the machining part or parts into an arrangement or an assembly and placing in an environment, passing a flow of a gas mixture containing oxygen and a controlled amount of a reducing agent through the environment, heating the environment to a temperature greater than 300oC and less than the auto-ignition temperature of the reducing agent, establishing contact between the article and the surface of the machining part or parts and moving the part or parts according to the specification to produce the artefact, stopping the flow of the gas mixture, allowing the environment to cool and extracting the artefact

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US20140335339A1: Single crystal cvd synthetic diamond material
Applicant: Element Six Technologies Ltd
Publication: 2014-11-13
Filed: 2014-06-04
Status: application

A single crystal CVD synthetic diamond material comprising: a total as-grown nitrogen concentration equal to or greater than 5 ppm, and a uniform distribution of defects, wherein said uniform distribution of defects is defined by one or more of the following characteristics: (i) the total nitrogen concentration, when mapped by secondary ion mass spectrometry (SIMS) over an area equal to or greater than 50×50 μm using an analysis area of 10 μm or less, possesses a point-to-point variation of less than 30% of an average total nitrogen concentration value, or when mapped by SIMS over an area equal to or greater than 200×200 μm using an analysis area of 60 μm or less, possesses a point-to-

point variation of less than 30% of an average total nitrogen concentration value; (ii) an as-grown nitrogen-vacancy defect (NV) concentration equal to or greater than 50 ppb as measured using 77K UV-visible absorption measurements, wherein the nitrogen-vacancy defects are uniformly distributed through the synthetic single crystal CVD diamond material such that, when excited using a 514 nm laser excitation source of spot size equal to or less than 10 μm at room temperature using a 50 mW 46 continuous wave laser, and mapped over an area equal to or greater than 50×50 μm with a data interval less than 10 μm there is a low point-to-point variation wherein the intensity area ratio of nitrogen vacancy photoluminescence peaks between regions of high photoluminescent intensity and regions of low photolominescent intensity is <2× for either the 575 nm photoluminescent peak (NV0) or the 637 nm photoluminescent peak (NV); (iii) a variation in Raman intensity such that, when excited using a 514 nm laser excitation source (resulting in a Raman peak at 552.4 nm) of spot size equal to or less than 10 μm at room temperature using a 50 mW continuous wave laser, and mapped over an area equal to or greater than 50×50 μm with a data interval less than 10 μm, there is a low point-to-point variation wherein the ratio of Raman peak areas between regions of low Raman intensity and high Raman intensity is <1.25×; (iv) an as-grown nitrogen-vacancy defect (NV) concentration equal to or greater than 50 ppb as measured using 77K UV-visible absorption measurements, wherein, when excited using a 514 nm excitation source of spot size equal to or less than 10 μm at 77K using a 50 mW continuous wave laser, gives an intensity at 575 nm corresponding to NV0 greater than 120 times a Raman intensity at 552.4 nm, and/or an intensity at 637 nm corresponding to NV− greater than 200 times the Raman intensity at 552.4 nm; (v) a single substitutional nitrogen defect (Ns) concentration equal to or greater than 5 ppm, wherein the single substitutional nitrogen defects are uniformly distributed through the synthetic single crystal CVD diamond material such that by using a 1344 cm−1 infrared absorption feature and sampling an area greater than an area of 0.5 mm2, the variation is lower than 80%, as deduced by dividing the standard deviation by the mean value; (vi) a variation in red luminescence intensity, as defined by a standard deviation divided by a mean value, is less than 15%; (vii) a mean standard deviation in neutral single substitutional nitrogen concentration of less than 80%; and (viii) a colour intensity as measured using a histogram from a microscopy image with a mean gray value of greater than 50, wherein the colour intensity is uniform through the single crystal CVD synthetic diamond material such that the variation in gray colour, as characterised by the gray value standard deviation divided by the gray value mean, is less than 40%

KR2014138934A: Process for manufacturing synthetic single crystal diamond material

Applicant: Element Six Technologies Limited
Publication: 2014-12-04
Filed: 2013-03-13
Status: application

A method for manufacturing a plurality of synthetic single crystal diamonds, the method comprising: forming a plurality of seed pads, each seed pad comprising a plurality of

single crystal diamond seeds anchored to, or embedded in, an inert holder; loading a carbon source, a metal catalyst, and the plurality of seed pads into a capsule; loading the capsule into a high pressure high temperature (HPHT) press; and subjecting the capsule to a HPHT growth cycle to grow single crystal diamond material on the plurality of single crystal diamond seeds, the HPHT growth cycle comprising: initiating HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds by increasing pressure and temperature; maintaining HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds via a pressure driven growth process by controlling and maintaining pressure and temperature; and terminating HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds by reducing pressure and temperature, wherein the plurality of single crystal diamond seeds remain anchored to, or embedded in, the inert holders during the HPHT growth cycle

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JP05615937B2: -
Applicant: Element Six Ltd
Publication: 2014-10-29
Filed: 2010-12-15
Status: granted

A chemical vapour deposition (CVD) method for synthesizing diamond material on a substrate in a synthesis environment, said method comprising: providing the substrate; providing a source gas; dissociating the source gas; and allowing homoepitaxial diamond synthesis on the substrate; wherein the synthesis environment comprises nitrogen at an atomic concentration of from about 0.4 ppm to about 50 ppm; and and wherein the source gas comprises: a) an atomic fraction of hydrogen, Hf, from about 0.40 to about 0.75; b) an atomic fraction of carbon, Cf, from about 0.15 to about 0.30; c) an atomic fraction of oxygen, Of, from about 0.13 to about 0.40; wherein Hf + Cf + Of = 1; wherein the ratio of atomic fraction of carbon to the atomic fraction of oxygen, Cf:Of, satisfies the ratio of about 0.45: 1 < Cf:Of < about 1.25: 1; wherein the source gas comprises hydrogen atoms added as hydrogen molecules, H2, at an atomic fraction of the total number of hydrogen, oxygen and carbon atoms present of between 0.05 and 0.40; and wherein the atomic fractions Hf, Cf and Of are fractions of the total number of hydrogen, oxygen and carbon atoms present in the source gas

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KR1454568B1: Microwave plasma reactors and substrates for synthetic diamond manufacture
Applicant: Element Six Limited
Publication: 2014-10-23
Filed: 2011-12-14
Status: granted

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a microwave generator

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

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US20140337035A1: Gem tester
Applicant: Sy Kessler Sales Inc
Publication: 2014-11-13
Filed: 2014-07-23
Status: application

A gem tester for testing a gem under test and a kit including a horizontal recharging stand are disclosed. In one embodiment of the gem tester, an elongated body has a line-of-sight contour tapering from a bulbous end to a radially deviating frontal nose having a probe extending therefrom. Internal circuitry measures electrical conductivity of the gem under test in order to identify the type of gem under test and drive a color control signal in response thereto. A light source is disposed proximate the probe in order to expose the gem under test to ultraviolet light prior to the internal circuitry measuring electrical conductivity. Identification of the gem under test may be made by audio or visual indication or a combination thereof

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JP05613841B2: Systems and methods for bundling diamonds into valued groupings
Applicant: IIA Technologies Pte Ltd
Publication: 2014-10-29
Filed: 2010-10-11
Status: granted

The present application discloses the details of a microwave plasma chemical vapor deposition process that uses Nitrogen and Diborane simultaneously in combination along with the Methane and Hydrogen gases to grow white color diamonds. The invention

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

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CA2686339C: Heart shaped diamond cut having hearts and arrows pattern
Applicant: Worldwide Diamond Trademarks Ltd
Publication: 2014-12-09
Filed: 2008-04-22
Status: granted

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

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WO2014195354A1: Post-synthesis processing of diamond and related super-hard materials
Applicant: Element Six Technologies Ltd
Publication: 2014-12-11
Filed: 2014-06-04
Status: application

A method of processing a super-hard material having a Vickers hardness of no less than 2000 kg/mm2, the method comprising: (a) forming a surface of the super-hard material to have a first surface profile within a first root mean square deviation from a smooth target surface profile, said first root mean square deviation being no more than 5 μm; (b) analysing said surface of the super-hard material to detect a plurality of protruding regions on said surface; and (c) selectively processing over only the protruding regions on the surface of the super-hard material to form a second surface profile within a second root mean square deviation from the smooth target surface profile, said second root mean square deviation being no more than 100 nm

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IN201305424P1: -
Applicant: Element Six Ltd
Publication: 2014-12-05
Filed: 2013-06-18
Status: granted

A microwave plasma reactor for manufacturing synthetic diamond material via chemical vapour deposition, the microwave plasma reactor comprising: a microwave generator configured to generate microwaves at a frequency f; a plasma chamber comprising a base, a top plate, and a side wall extending from said base to said top plate defining a resonance cavity for supporting a microwave resonance mode, wherein the resonance cavity has a central rotational axis of symmetry extending from the base to the top plate, and wherein the top plate is mounted across said central rotational axis of symmetry; a microwave coupling configuration for feeding microwaves from the microwave generator into the plasma chamber; a gas flow system for feeding process gases into the plasma chamber and removing them therefrom; and a substrate holder disposed in the plasma chamber and comprising a supporting surface for supporting a substrate on which the synthetic diamond material is to be deposited in use; wherein the resonance cavity is configured to have a height, as measured from the base to the top plate of the plasma chamber, which supports a TM011 resonant mode between the base and the top plate at said frequency f, and wherein the resonance cavity is further configured to have a diameter, as measured at a height less than 50% of the height of the resonance cavity as measured from the base, which satisfies the condition that a ratio of the resonance cavity height / the resonance cavity diameter is in the range 0.3 to 1.0

WO2014203266A1: Method and device for gemstone evolution
Applicant: Patel Arvindbhai Lavjibhai
Publication: 2014-12-24
Filed: 2013-09-11
Status: application

A method and device are provided for determining the properties and evolution of gemstone by detecting the internal and external structure of the gemstone. The method and device are used to identify the size, location of impurities/defects in raw gemstone with the help of optimized spectroscopy scanning and are used for precise automatic evolution of gemstones and possibilities of final value of planned gemstone after remaining gemstone processing cycle

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CA2737469C: Decagonal shaped diamond which displays hearts and arrows pattern
Applicant: Sundiamond USA Corp
Publication: 2014-11-25
Filed: 2008-09-16
Status: granted

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.

IN201300773P1: -
Applicant: Octonus Finland Oy
Publication: 2014-10-24
Filed: 2013-01-24
Status: granted

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

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AU2010222274C1: Methods and systems of imaging cut stones
Applicant: Sarin Color Technologies Ltd
Publication: 2014-11-06
Filed: 2010-03-11
Status: granted

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

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US8878145B1: Apparatus and method for fluorescence spectral and color measurements of diamonds, gemstones and the like
Applicant: Liu Yan
Publication: 2014-11-04
Filed: 2012-07-27
Status: granted

An apparatus and method for fluorescence spectral and color measurements of diamonds, gemstones and the like. The apparatus 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 lens system, a baffle, an

ultraviolet radiation source on the top of the sample integrating sphere, and another light source attached to the measurement integrating sphere. The sample on the sample platform is radiated by the ultraviolet radiation source on the top of the measurement integrating sphere. The sample emits fluorescent light into the measurement integrating sphere, and the fluorescent light is received by the lens system. The spectrometer separates the fluorescent light into spectral signals, and the computer calculates the fluorescence spectrum and colorimetric data

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JP2014161990A: Diamond grinding device and diamond grinding method

Applicant: Kochi Fel KK
Publication: 2014-09-08
Filed: 2013-02-27
Status: Application

Problem to be solved: To provide a diamond grinding device and method little in dependency of grinding direction to the crystal orientation of diamond and having a grinding speed higher than that of the conventional diamond grinding devices
Solution: A diamond grinding device is provided with a rotating grinding plate and a retention mechanism. The retention mechanism retains the diamond being an object to be ground and the grinding face of the grinding plate in a state contacting each other. In the grinding face of the grinding plate, the material of at least the sliding face contacting with the diamond is a glass, and the softening point of the glass is 720°C or higher but 830°C or below

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