

State of the art

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US7315356: Fire demonstration tool and method for using thereof

Applicant: -
Publication: 2008-01-01
Filed: 2004-05-13
Status: granted

The present invention is directed to a device for imaging a gem, and more specifically, a device capable of imaging the fire of a gem and thereby enabling the qualitative assessment of the fire of the gem. The gem imaging device of the present invention includes an exterior assembly and an inner assembly. The exterior assembly includes a viewing system, an outer housing and a base, while the inner assembly includes a view opening, a light baffle, an illumination mechanism, a diffuser plate mechanism, an outer chamber, an inner chamber, a perforated inner compartment and a rotation mechanism. In use, a user images a gem located in the inner assembly of the gem imaging device, and specifically, located within the inner chamber. Based on the light reflected on, into or from the gem, the user may image the gem, and specifically, the fire of the gem.

US20070296954A1: Fluorescence measuring device for gemstones

Applicant: Gemological Institute of America, Inc.
Publication: 2007-12-27
Filed: 2007-08-24
Status: application

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

US20070290408A1: Annealing single crystal chemical vapor deposition diamonds

Applicant: Carnegie Institution of Washington
Publication: 2007-12-20
Filed: 2007-05-22
Status: application

A method to improve the optical clarity of CVD diamond where the CVD diamond is single crystal CVD diamond, by raising the CVD diamond to a set temperature of at least 1500 degrees C. and a pressure of at least 4.0 GPa outside of the diamond stable phase.

US20070283881A1: System and method for producing synthetic diamond

Applicant: Apollo Diamond, Inc., United States of America
Publication: 2007-12-13
Filed: 2007-07-12
Status: application

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

US7309477: Ultrahard diamonds and method of making thereof

Applicant: Carnegie Institution of Washington, United States of America
Publication: 2007-12-18
Filed: 2006-04-11
Status: granted

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

US7306441: High pressure crystal growth apparatuses and associated methods

Applicant: -
Publication: 2007-12-11
Filed: 2004-02-06
Status: granted

High pressure synthesis of various crystals such as diamond, CBN and the like can be carried out using reaction assemblies suitable for use in methods such as temperature gradient methods. The reaction assembly can be oriented substantially perpendicular to gravity during application of high pressure. Orienting the reaction assembly in this manner can avoid detrimental effects of gravity on the molten catalyst, e.g., convection, hence increasing available volumes for growing high quality crystals. Multiple reaction assemblies can be oriented in series or parallel, each reaction assembly having one or more growth cells suitable for growth of high quality crystals. Additionally, various high pressure apparatuses can be used. A split die design allows for particularly effective results and control of temperature and growth conditions for individual crystals.

EP1867760A2: Method for manufacturing diamond single crystal substrate, and diamond single crystal substrate

Applicant: Sumitomo Electric Industries, Ltd., Japan
Publication: 2007-12-19
Filed: 2006-03-23
Status: application

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

WO07147214A1: Method and apparatus for polishing diamond and diamond composites

Applicant: The University of Sydney, Australia
Publication: 2007-12-27
Filed: 2007-06-22
Status: application

A method and apparatus for polishing a diamond material is disclosed. The method comprises the steps of positioning a sample of the diamond material in relation to a movable metallic surface, and bringing the diamond material sample into contact with the

movable metallic surface with simultaneous movement of the metallic surface and rotation of the diamond material sample. Two or more samples of the diamond material can be evenly spaced around a circumference of an imaginary circle centred on an axis of movement of the metallic surface, to be brought into contact with the movable metallic surface whilst moving the metallic surface on its axis. The apparatus can comprise a drive arranged to effect such movements, as well as a lift and place mechanism to constrain sample movements.

JP2007521113T2: Method of incorporating a mark in CVD diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2007-08-02
Filed: 2004-12-10
Status: application

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

JP2007210815A2: Method for producing diamond single crystal and diamond single crystal produced thereby

Applicant: National Institute of Advanced Industrial Science and Technology, Japan
Publication: 2007-08-23
Filed: 2006-02-08
Status: application

Problem to be solved: To provide a novel method for producing a diamond single crystal which is a method for growing a diamond single crystal by a vapor-phase synthesis process and by which a very-low-impurity-content high-quality diamond single crystal having a regular growth face can be produced relatively simply and which is effectively used as a synthesis method for a large-size diamond single crystal.

Solution: The method for producing a diamond single crystal is a method for growing a diamond single crystal by a microwave CVD process wherein a diamond single crystal having a growth face being in parallel with the (110) face of the diamond single crystal and having a surface roughness of 1 to 10 μm in terms of a maximum height can be obtained by performing crystal growth under such conditions that a diamond (110) substrate is used as a seed crystal, the raw material gas flow rate is such that 0.2 to 20

methane and below 0.12 nitrogen are set per 100 hydrogen, the pressure in the CVD chamber is 13 to 33 kPa, and the growth temperature is 950 to 1,250°C.

JP2007191362A2: Method for producing diamond

Applicant: National Institute of Advanced Industrial & Technology, Japan
Publication: 2007-08-02
Filed: 2006-01-20
Status: application

Problem to be solved: To provide a method by which the shape (morphology) of the growth surface of a diamond can be easily controlled when a diamond single crystal is grown by a microwave plasma CVD process.

Solution: In a method for producing the diamond, comprising growing a diamond crystal on a diamond substrate by the microwave plasma CVD process, the shape of the growth surface of the diamond is controlled by using a holder in which a substrate mounting part is formed by a recessed part and the depth of the recessed part is equal to or shallower than the thickness of the diamond substrate as a substrate holder provided in a CVD apparatus, and regulating the mounting position of the diamond substrate at the substrate mounting part. The substrate holder has a substrate mounting part formed according to the shape of a diamond substrate to be used.

WO07123600C2: Multiplet gemstones with directly printed embedded translucent images

Applicant: Signity Americas Ltd, Malinowski Jack, United States of America
Publication: 2007-12-21
Filed: 2007-03-06
Status: complete corrected document

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

WO08008771A2: System and method for gemstone microinscription

Applicant: Lazare Kaplan International, Inc., United States of America
Publication: 2008-01-17
Filed: 2007-07-10
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.

US20080006615A1: System and method for gemstone microinscription

Applicant: Lazare Kaplan International, Inc
Publication: 2008-01-10
Filed: 2007-07-09
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.

WO08007336A2: A method for producing diamond material

Applicant: Element Six Technologies (Pty) Ltd South Africa
Publication: 2008-01-17
Filed: 2007-07-10
Status: application

The present invention relates to synthesised diamond material having at least two of the following characteristics: a nitrogen content of at least 100 ppm; a crystal morphology index (CMI) of either less than four or greater than six; a uniform distribution of nitrogen in the majority volume of the crystal where the majority volume is at least 50% of the total volume of the crystal; a low transition metal impurity content, where 'low' is less than 100 ppm by mass; and a crystal shape with absence of minor facets, where 'minor facets' are all facets other than {100} and {111} facets. The invention further relates to a method of producing diamond material including the step of providing a reaction mass including sufficient nitrogen to result in diamond material having a nitrogen content of at least 100 ppm in combination with a transition metal vector and subjecting the reaction mass to a temperature of greater than 12000C and a pressure greater than 5 GPa.

WO08003052A2: Gemstone laser marking system and method

Applicant: -
Publication: 2008-01-03
Filed: 2007-06-28
Status: application

A gemstone laser marking system and method in which a rough or polished diamond or other gemstone is marked with one or more laser pulses which have an ultra-short duration of less than 10 picoseconds. The laser pulses are generated by a pulsed laser which may be a mode lock laser. The ultra-short laser pulses are focused on the gemstone surface or bulk using a focusing device to mark the gemstone. The relative displacement between the gemstone mount and the path of the laser pulse(s) can be varied in order to mark a pattern or feature, which may be for example a data matrix, a bar code, a glyphic text, a photograph, or other digital data and analogue data, on the surface of the polished or rough gemstone.

US20080015870A1: Apparatus and method for facilitating a search for gems

Applicant: -
Publication: 2008-01-17
Filed: 2003-05-30
Status: application

Apparatus and method for facilitating a search for gems are described. In one embodiment, a computer-readable medium includes instructions to provide a sliding display element for a gem attribute. The sliding display element includes a bar and a slider. The bar represents a nonlinear scale of values of the gem attribute. The slider is configured to be disposed at one of a plurality of positions with respect to the bar. The slider is disposed at a first position with respect to the bar, and the first position is associated with a first value of the gem attribute. The computer-readable medium also includes instructions to identify a first plurality of gems associated with the first value.

US20080003447A1: Materials and methods for the manufacture of large crystal diamonds

Applicant: -
Publication: 2008-01-03
Filed: 2007-02-07
Status: application

Materials and methods are provided for forming single crystal diamond growth using microwave plasma chemical vapor deposition (CVD) process in partial vacuum with a gaseous mixture containing a methane/hydrogen mixture with optional nitrogen, oxygen and xenon addition. The single crystal substrate can be formed by a modified directional solidification process starting with at least one of the following: pure nickel or a nickel alloy which includes cobalt, iron, or a combination thereof using a vacuum induction

melting process. A surface of the single crystal substrate is coated using an electron beam evaporation device with pure iridium or an alloy of iridium and a component selected from the group consisting of iron, cobalt, nickel, molybdenum, rhenium and a combination thereof. The alloy coated single crystal substrate is positioned in a microwave plasma CVD reactor and upon being subjected to a biased enhanced nucleation treatment in the presence of a gaseous mixture of methane, hydrogen, and other optional gases with a biased voltage of negative 100 to 400 volts supports the growth of a large single crystal diamond on its coated surface.

US20080000885A1: Laser marking system

Applicant: -
Publication: 2008-01-03
Filed: 2006-03-14
Status: application

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

US7324188: Characterization of color and clarity enhancement agents in gems

Applicant: American Gemological Laboratories, Inc., United States of America
Publication: 2008-01-29
Filed: 2006-09-11
Status: granted

An apparatus for detecting one or more organic compounds in a gem, comprising a probe for irradiating a surface of a gem with near infrared radiation, to generate internal reflections of the near infrared radiation within the gem, wherein the internal reflections are substantially diffuse; a near infrared radiation transmissive conduit for collecting internally reflected near infrared radiation from a surface of the gem, the internally

reflected energy comprising components which are diffuse; a spectrometer for analyzing the collected internally reflected diffuse near infrared radiation from the gem, to determine if spectral characteristics indicative of at least one organic compound are present in the gem.

US7323156: High pressure/high temperature production of colorless and fancy-colored diamonds

Applicant: Bellataire International, United States of America
Publication: 2008-01-29
Filed: 2003-12-15
Status: granted

The present invention is directed to a method for changing the color of colored natural diamonds. The method includes placing a discolored natural diamond in a pressure-transmitting medium which is consolidated into a pill. Next, the pill is placed into a high pressure/high temperature (HP/HT) press at elevated pressure and elevated temperature for a time sufficient to improve the color of the diamond. The diamond may be exposed at elevated-pressure and elevated-temperature conditions within the graphite-stable region of the carbon-phase diagram—without significant graphitization of the diamond, or above the diamond-graphite equilibrium and within the diamond-stable region of the carbon-phase diagram. Finally, the diamond is recovered from said press. Colorless Type Ia and Type II diamonds may be made by this method.

US7315356: Fire demonstration tool and method for using thereof

Applicant: -
Publication: 2008-01-01
Filed: 2004-05-13
Status: granted

The present invention is directed to a device for imaging a gem, and more specifically, a device capable of imaging the fire of a gem and thereby enabling the qualitative assessment of the fire of the gem. The gem imaging device of the present invention includes an exterior assembly and an inner assembly. The exterior assembly includes a viewing system, an outer housing and a base, while the inner assembly includes a view opening, a light baffle, an illumination mechanism, a diffuser plate mechanism, an outer chamber, an inner chamber, a perforated inner compartment and a rotation mechanism. In use, a user images a gem located in the inner assembly of the gem imaging device, and specifically, located within the inner chamber. Based on the light reflected on, into or from the gem, the user may image the gem, and specifically, the fire of the gem.

JP2007238377A2: Manufacturing method of base material for growing single crystal diamond

Applicant: Shin Etsu Chem Co Ltd
Publication: 2007-09-20
Filed: 2006-03-08
Status: application

Problem to be solved: To provide a manufacturing method of a base material for growing single crystal diamond which can grow single crystal diamond more securely.

Solution: In a manufacturing method of a base material for growing single crystal diamond, the manufacturing method of a base material for growing single crystal diamond is characterized in that a bias processing for previously conducting a diamond nucleus forming against the base material before diamond growth by a direct current discharge where the base material side electrode is used as a cathode, and in that in the bias processing the temperature of the base material after at least 40 seconds from starting of the bias processing until ending of the bias processing is kept at $800\pm 60^{\circ}\text{C}$.

JP2007204307A2: Method for synthesizing diamond

Applicant: Sumitomo Electric Ind Ltd
Publication: 2007-08-16
Filed: 2006-02-01
Status: application

Problem to be solved: To provide a method for improving characteristics of a diamond heteroepitaxial film grown on the substrate of a different kind of single crystal and making the film like a single crystal.

Solution: On a diamond heteroepitaxial film grown on the substrate of a different kind of single crystal, one or a plurality of convex parts are formed and diamond is grown in step-flow fashion from the convex parts as a starting point. The convex parts are formed by selectively growing the corresponding parts, or by laser-processing or wet or dry etching the other parts. Also, the growth in step-flow fashion can be achieved by growing diamond at a comparatively low methane concentration and a high temperature.

EP1907223A2: Method for gluing precious stones

Applicant: Swarovski & Co, Austria
Publication: 2008-04-09
Filed: 2006-06-29
Status: application

Gem stones gluing method for use on leather e.g. cracked leather, involves enlarging end of recess facing gem stones by stamping according to contour of stones, and then gluing stones into enlargement of recess with base layer of leather

EP1625805B1: Dancing stone for suspending from an article of jewellery

Applicant: Thapar, Arun, Kitano Cho Chuo, Kobe, Japan
Publication: 2008-03-26
Filed: 2004-11-04
Status: granted

A stone for suspending from an article of jewellery, the stone having a crown a pavilion, a table, a girdle, and a culet. The improvement includes a throughbore extending from the crown to the pavilion of the stone allowing the stone to have improved structural integrity and to have improved luster by virtue of reducing refraction, reflection, and dispersion errors, and when suspended by the throughbore from the article of jewellery, by virtue of eliminating visually obstructive conventional settings, has improved scintillation, improved visibility, and gives an impression that it is floating in air or dancing relative to the article of jewellery.

WO08045613A2: Diamond valuation method, apparatus and computer readable medium product

Applicant: Rosy Blue, United Arab Emirates, Fleit, Lois, United States of America
Publication: 2008-04-17
Filed: 2007-07-30
Status: application

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

US20080085233A1: Single crystal diamond

Applicant: -
Publication: 2008-04-10
Filed: 2007-05-03
Status: application

A method of producing a large area plate of single crystal diamond from CVD diamond grown on a substrate substantially free of surface defects by chemical vapour deposition (CVD). The homoepitaxial CVD grown diamond and the substrate are severed transverse to the surface of the substrate on which diamond growth took place to produce the large area plate of single crystal CVD diamond.

US7362109: Gem tester using electrical photoconductivity

Applicant: -
Publication: 2008-04-22
Filed: 2005-10-18
Status: granted

Diamond look-alikes like cubic zirconium, moissanite and other synthetic stones, are distinguishable from nature diamonds based on their thermal and/or electrical conductivities. Gem testers that are on the market are capable of evaluating these two parameters as is the present invention. Electrical resistance of moissanites reaches hundreds of thousands megohms. Existing gem testers use test voltage of 1000 volts, to be able to detect electrical conductivity in most moissanites. Still, reliable detection of high resistance moissanites is difficult. Proposed invention uses significant photo conductivity of moissanites, which was observed by the inventors, to facilitate measurement of electrical conductivity in the toughest gems, to reduce test voltage applied to gems to 300 volts, and to limit electrical test current through a gem to no more than a few micro-amps. Other refinements include: multistep evaluation of electrical conductivity, which avoids applying excessive or unnecessary test voltage and current to a gem, circuit design, which efficiently attenuates AC noise, signal processing, which eliminates industrial pick-up, usage of reference temperature sensor, which improves sensibility and repeatability of thermal measurements.

US7355683: Systems and methods for evaluating and displaying the dispersion of a diamond or other gemstone

Applicant: American Gem Society, Las Vegas, NV, United States of America
Publication: 2008-04-08
Filed: 2006-03-24
Status: granted

Systems and methods for evaluating and displaying a diamond's dispersion or fire potential. These systems and methods can be used to determine the dispersion of a

diamond relative to an observation point, which can then be used to provide for a map or other indicator of a diamond's fire potential when it is observed from that point.

US7364317: Method and apparatus for object viewing, observation, inspection, identification, and verification

Applicant: -
Publication: 2008-04-29
Filed: 2005-12-08
Status: granted

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

EP1524074B1: Device for controlling gemstone polishing assembly movement

Applicant: Botha, Michiel J., Yellowknife, NT X1A 3R6, Canada
Publication: 2008-04-09
Filed: 2004-10-11
Status: granted

The present invention pertains to a device for controlling polishing assembly movement. The device comprises a vertical rod, a motive power means for lowering and lifting, and rotating, oscillating, or both rotating and oscillating the vertical rod about an axis of rotation coaxial with the vertical rod. The device also comprises a pin that is offset from the axis of rotation and connected to the vertical rod for mounting the polishing assembly. Optionally, the device may comprise a sensor for activating movement of the vertical rod.

US20080085665A1: Apparatus for polishing gemstones

Applicant: -
Publication: 2008-04-10
Filed: 2007-12-07
Status: application

Disclosed is an apparatus for working gemstones. The apparatus comprises an abrading article and a rotatable support with a guiding feature for holding and rotating the article. The abrading article has a mounting bore substantially larger than the guiding feature. A

balancing arrangement facilitates balancing of the article, and an abrading article removal tool is operative to remove the abrading article from the rotatable support.

JP2007331955A2: Method for producing diamond

Applicant: National Institute of Advanced Industrial & Technology
Publication: 2007-12-27
Filed: 2006-06-12
Status: application

Problem to be solved: To provide a method by which the shape (morphology) of the growth surface of a diamond can be easily controlled when a diamond single crystal is grown on a diamond substrate by a microwave plasma CVD process.

Solution: The method for producing a diamond comprises conducting the growth of the diamond by controlling the shape of the growth surface of the diamond by adjusting the thickness of a member that includes the top plate of the substrate surrounding member, wherein the substrate holder is a substrate holder that is composed of an electrically conducting material and is provided with the substrate surrounding member around the periphery of a substrate mounting part and that has a structure wherein the substrate holder including the substrate surrounding member is integrated or has a structure wherein a given thickness part can be separated from the top plate of the substrate surrounding member, as well as the substrate holder for producing a diamond is a substrate holder that is composed of an electrically conducting material and is provided with the substrate surrounding member around the periphery of a substrate mounting part and that has a structure wherein the substrate holder including the substrate surrounding member is integrated or has a structure wherein a given thickness part can be separated from the top plate.

JP2007314379A2: Natural method of promoting acquisition of diamond and carbon crystal

Applicant: Efremov Valery Yulievich
Publication: 2007-12-06
Filed: 2006-05-26
Status: application

Problem to be solved: To reproduce a natural process of forming a mineral crystal by a method of producing a natural initial condition.

Solution: The natural method of promoting the acquisition of diamond and a carbon crystal by this invention is composed of a step of cooling at first an initial material (a mixture for obtaining a crystal containing the diamond and the carbon) to an ultralow temperature (-190 to -270°C), a step of obtaining a risen (increased) temperature till a boiling point of the initial material by the consumption of energy injected to an inside of the initial material of the diamond and the crystal containing the carbon and a step of forming and growing the crystal, and composed of a system for cooling the material and a system for injecting the energy to the inside of the material. The vessel having the initial

material is placed in a refrigeration room. An electronic wire is connected to an electrode and placed at the inside of the vessel. The device and an adaptation are placed at a region for forming the mineral crystal in the vessel having the initial material and these are catalysts (accelerators) of the diamond.

JP2007314401A2: Method for producing diamond

Applicant: Takagi Yoshiki, Mitsubishi Pencil Co Ltd
Publication: 2007-12-06
Filed: 2006-05-29
Status: application

Problem to be solved: To safely produce diamond in an inert gas atmosphere by a heat filament CVD method.

Solution: Two electrode rods connected to an electric power source are arranged in a chamber, and a carbon-based heat filament is connected between the electrode rods, as a heat filament. Diamond is deposited on a substrate by supplying an electric current to the filament so that the surface temperature of the filament is raised to 2,000°C or higher, preferably a temperature of 2,200-2,500°C in the inert gas atmosphere.

JP2007253244A2: Method and apparatus for polishing

Applicant: Kumamoto Technology & Industry Foundation
Publication: 2007-10-04
Filed: 2006-03-20
Status: application

Problem to be solved: To provide a method and an apparatus for polishing, by which method and apparatus, the surface of a board made of SiC, diamond, etc. are very smoothly and efficiently polished without causing sub-surface damage.

Solution: The apparatus for polishing comprises: a polishing plate having a reflective film formed on its back face; and an ultraviolet light source lamp and an infrared light source lamp which are both arranged on the front face side of the polishing plate. In the state that the polishing surface of the board is pressed against the surface of the polishing surface plate, a polishing operation is carried out by relatively sliding the board with respect to the polishing plate while radiating the ultraviolet light from the front face side of the polishing plate with required light flux. The ultraviolet light entered the polishing plate passes through the polishing plate and is reflected by the reflective film formed on the back face of the polishing plate. As a result, the whole surface of the polishing surface is irradiated with the ultraviolet light L, and oxide films formed on the polishing surface are removed, and the polishing operation is carried out. Thus, very smooth and efficient polishing is realized by effectively utilizing the ultraviolet light. Further, the size of the apparatus can be reduced, and a degree of freedom of design is increased.

EP1895868A1: Precious, semi-precious or mineral cut stone and method for cutting same

Applicant: Sato Takehiko - Belgium, Koganei Misuzu - Japan
Publication: 2008-03-12
Filed: 2006-05-19
Status: application

Precious, semi-precious or mineral cut stone e.g. diamond, for assembled jewel, has pavilion comprising top facets extended from pointed culet to intermediate location between girdle and pointed culet

AT0387117E: Vorrichtung und satz zur visualisierung eines schleifplans für einen diamant und verfahren zur bestimmung eines schleifplans

Applicant: Dianscan NV - Belgium
Publication: 2008-03-15
Filed: 2003-11-05
Status: EP Patent valid in AT

Cutting state monitoring kit for rough diamond, has three dimensional markings on solid surface so as to indicate position and shape of cut diamonds, and physical forms of cut and rough diamonds

WO08032152A1: High-speed rotary diamond cutting machine

Applicant: Scheffer Cornelius, Wegner Emile - South Africa
Publication: 2008-03-20
Filed: 2007-08-23
Status: application

A rotary diamond cutting machine is provided comprising a base supporting a rotatable driven shaft by way of at least one bearing and wherein the shaft has a flange assembly for mounting a working disc thereto so as to be driven in unison with the shaft. The shaft is collinear with a rotor of a prime mover that is to impart rotary motive power to operatively drive the shaft and is either secured directly to the driven shaft will coupled thereto by way of a coupling, typically a magnetic coupling. The rotor may be a fluid, typically air, driven turbine in which instance it preferably has an endless series of pockets formed in an outer cylindrical surface thereof and into which a jet of compressed air can be directed. Alternatively, the rotor may be that of an induction or brushless electric motor. Preferably, the machine has a single central bearing that is conveniently an air bearing.

US20080055582A1: Apparatus for generating data for determining a property of a gemstone and methods and computer programs for determining a property of a gemstone

Applicant: Overseas Diamonds Technologies, Antwerp, Belgium
Publication: 2008-03-06
Filed: 2007-08-08
Status: application

A method of determining a property of gemstone using image data corresponding to two or more electronic images of the gemstone captured under different lighting conditions, the method comprising: selecting a first image portion from a first electronic image of the gemstone which was captured under a first lighting condition, the first image portion comprising one or more pixels corresponding to a region of the gemstone; selecting a second image portion from a second electronic image of the gemstone which was captured under a second lighting condition different from the first lighting condition, the second image portion comprising one or more pixels corresponding to the same region of the gemstone as the first image portion; and comparing the first image portion with the second image portion.

US20080057145A1: Assembly for HPHT Processing

Applicant: -
Publication: 2008-03-06
Filed: 2006-08-31
Status: application

An improved assembly for HPHT processing having a can with an opening and a mixture disposed within the opening. A sealant barrier is positioned atop the mixture. First and second lids are positioned atop the mixture. A meltable sealant positioned intermediate the second lid and a cap covering the opening

WO08029736A1: Method for separating surface layer or growth layer of diamond

Applicant: National Institute of Advanced Industrial Science and Technology, Japan
Publication: 2008-03-13
Filed: 2007-08-31
Status: application

This invention provides a method for separating a surface layer of diamond, characterized by comprising implanting ions into diamond to form a nondiamond layer in a part around the surface of the diamond, then applying an alternating current across electrodes in an electrolysis solution to etch the nondiamond layer of the diamond. There is also provided a method for separating a growth layer of diamond, comprising the step of, after the formation of the nondiamond layer by the above method, further growing diamond by a gaseous phase synthesis method. The above method can be applied to various single crystal and polycrystalline diamonds. In particular, even a large single crystal diamond, a

part of the single crystal diamond can be separated in a reutilizable form in a relatively short time with high efficiency.

JP2007296194A2: Diamond and its machining method

Applicant: Crossfor
Publication: 2007-11-15
Filed: 2006-05-01
Status: application

Problem to be solved: To provide diamond and its machining method for markedly improving the reflectance of pavilion while reducing the cut amount of diamond.
Solution: The diamond is formed with a reflecting layer at least at a part of the surface of pavilion to reflect incident light on the internal side. The diamond is preferably machined to cut a part other than the pavilion into desired shape after the reflecting layer for reflecting the incident light inside is formed at the whole diamond in a half-machined state formed only with the pavilion by cutting.

JP2007252684A2: Cutting structure of jewelry

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

Problem to be solved: To provide novel cutting structure of jewelry, in which a virtual image of a cut shape made by reflection of a cut shape formed on a pavilion side is integrally come up with the cut shape on the pavilion side when it is viewed from a table direction.
Solution: Top parts of five basic cut faces are formed so as to converge toward the bottom of the pavilion. Adjoining basic cut faces share adjoining sides and so on. Small cutting is applied along the shared sides toward a culet so that a star shape is made by an outline formed of a group of small cut faces.

JP03962695B2

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

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

JP2007210821A2: Method for synthesizing hard material by using laser, and method for reforming surface by laser

Applicant: Japan Atomic Energy Agency, Univ of Yamanashi, Takashima Hideaki
Publication: 2007-08-23
Filed: 2006-02-08
Status: application

Problem to be solved: To provide a method for synthesizing diamond and cubic boron nitride (c-BN) each having an arbitrary shape.

Solution: The diamond and the c-BN each having the arbitrary shape of millimeter order are synthesized by irradiating graphite and hexagonal boron nitride (h-BN) with pulse laser from various directions, instantaneously and locally forming a high temperature and high pressure environment, and moving the position of condensing point on the graphite and h-BN to move the synthesis point. Further, it is possible to form the coating of the diamond or the c-BN by synthesizing the diamond or the c-BN by means of a laser irradiation.

JP2007284773A2: Method for synthesizing diamond

Applicant: Sumitomo Electric Ind Ltd
Publication: 2007-11-01
Filed: 2006-04-20
Status: application

Problem to be solved: To form a large-area diamond film with uniform film thickness and film quality by uniformizing a temperature of a substrate through optimizing the arrangement of filaments, with a hot-filament CVD method.

Solution: The method for synthesizing diamond includes introducing a mixed gas of a source gas containing carbon and hydrogen onto the surface of metal filament heated to 1,800°C or higher, which are arranged so as to face to the substrate, and so as to be approximately parallel to each other, and decomposing the mixed gas to grow diamond on the surface of the substrate. The filaments are arranged so that spaces between the filaments or between the filament and the substrate in the center part of the metal filament group can be wider than spaces between the filaments or between the filament and the substrate in the end part of the filament group, to uniformize a temperature of the surface of the substrate.

JP2007269576A2: Synthesizing method and synthesizing device of cluster diamond

Applicant: Nof Corp
Publication: 2007-10-18
Filed: 2006-03-31
Status: application

Problem to be solved: To provide a method and device capable of easily and efficiently synthesizing a cluster diamond from an organic explosive by using a simple device.

Solution: The synthesizing method comprises a first process for exploding the explosive and a second process for recovering a product by explosion and purifying a recovered product. In the first process, the organic explosive having an initiation means is arranged nearly at the center of a space part in a pressure vessel in a state wherein the organic explosive is housed in a bag body through a cooling agent, and the organic explosive is exploded by the initiation means under a condition wherein an outer space part of the bag body is filled with a gas inactive to a carbon atom in the organic explosive.

GB2441044A: A method of incorporating a mark in CVD diamond.

Applicant: Element Six Ltd, United Kingdom
Publication: 2008-02-20
Filed: 2007-08-14
Status: application

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

CA2418534C: Cut design of diamonds providing plenty of visual-perceptible reflection for ornamental use and observation method thereof

Applicant: Hohoemi Brains Inc, Japan
Publication: 2008-01-29
Filed: 2003-02-06
Status: Patent (Law 1989)

A cut design of an ornamental diamond and an observation method of the diamond which an observer can perceive a more beauty, are disclosed. The cut design is a round brilliant cut comprising a girdle, a crown above the girdle and a pavilion below the girdle. A girdle height (h) is 0.026 to 0.3 times a girdle radius, a pavilion angle (p) of a pavilion main facet ranges from 37.5 degrees to 41 degrees, and a crown angle (c) of a crown main facet is within a range of satisfying: $c > -2.8667xp + 134.233$ and $p < 1/4x \{(\sin.1(1/n) + \sin.1(1/n.\text{sinc}))x180/\pi + 180 - 2c\}$, wherein n: refraction index of a diamond, π : circular constant, p: pavilion angle in degrees, and c: crown angle in degrees.

WO08020092A1: Improvements introduced into patent p200500389 for "personalized synthetic diamond of different colours, obtained from (living or dead) human or animal keratin and production method thereof"

Applicant: Instituto De Monocristales, Spain
Publication: 2008-02-21
Filed: 2007-04-04
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.

US20080034793A1: Gemstone cut

Applicant: -
Publication: 2008-02-14
Filed: 2007-08-08
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.

EP1679987B1: Device and kit for visualising a cutting regime of a diamond, and a method for determining a cutting regime

Applicant: Dianscan N.V.
Publication: 2008-02-27
Filed: 2003-11-05
Status: granted

A kit for visualising a cutting regime of a rough diamond comprising: a solid, translucent substance into which three dimensional images are marked, said markings indicating: the outer surface of the original rough diamond, if present in said rough diamond, the internal defects of the rough diamond, said markings indicating the position and shape of said defects with respect of the rough diamond, the outer surface of one or more cut diamonds, said markings indicating the position and shape of said cut diamonds with

respect of the rough diamond, and solid, physical representations of one or more diamonds indicated by the markings of item, and/or solid, physical representation of the rough diamond, corresponding to the markings of item, and/or one or more actual cut diamonds indicated by the markings of item.

WO08020345A1: An illuminating module for a sorter

Applicant: Primus Special Projects Ltd, South Africa
Publication: 2008-02-21
Filed: 2007-04-25
Status: application

An illuminating module for a sorter, such as a diamond sorter, includes housing and a plurality of lasers located in the housing. The housing has a top, a bottom, a first and a second side. The plurality of lasers are arranged at different distances from the first and second sides so that the lasers emit beams of light parallel to the first and second sides, and wherein at least some of the lasers are arranged at different distances to the top and the bottom from at least some of the other lasers. In one example embodiment, the plurality of lasers are arranged in a plurality of rows and wherein each row includes a plurality of lasers located adjacent one another. Each laser is located in a laser holder and the housing includes a plurality of openings therein that is sized to receive a laser holder. The housing includes a cooling system including a plurality of channels or tubes running through the housing through which a cooling agent can be passed. The module also includes a clean-up filter and a laser beam collimator located in front of the housing.

WO08020344A1: A light detecting module for a sorter

Applicant: Primus Special Projects Ltd, South Africa
Publication: 2008-02-21
Filed: 2007-04-25
Status: application

A light detecting module for a sorter includes a housing including a plurality of openings therein. A primary collimator is located in each of the openings in the housing, the primary collimator having an inner surface that is not smooth to eliminate reflections off this surface. A filter is located in each of the openings behind each of the primary collimators. A secondary collimator is located in each of the openings in the housing, the secondary collimator having an inner surface that is not smooth to eliminate reflections off this surface. Finally, a light detector is located in each of the openings behind the secondary collimator.

WO08020343A2: A sorter

Applicant: Primus Special Projects Ltd, South Africa
Publication: 2008-02-21
Filed: 2007-04-25

Status: application

According to a first embodiment there is provided a sorter including a plurality of light emitters and a plurality of light receivers. A feeding system is used for feeding diamond containing material between the plurality of light emitters and plurality of light receivers. A processor is used to receive signals from the light receivers and to use the signals to detect diamonds within the diamond containing material and a sorting mechanism responsive to the processor to remove diamonds from the diamond containing material. The plurality of light emitters are typically lasers and the plurality of light receivers are typically photon multiplier tubes. The sorter may include at least one Raman filter located in front of the lighter receivers.

US20080047484A1: Superabrasive particle synthesis with growth control

Applicant: -
Publication: 2008-02-28
Filed: 2007-08-07
Status: application

An improved method for synthesizing superabrasive particles provides high quality industrial superabrasive particles with high yield and a narrow size distribution. The synthesis method can include forming a growth precursor of a substantially homogeneous mixture of raw material and catalyst material or layers of raw material and metal catalyst. The growth precursor can have a layer of adhesive over at least a portion thereof. A plurality of crystalline seeds can be placed in a predetermined pattern on the layer of adhesive. The growth precursor can be maintained at a temperature and pressure at which the superabrasive crystal is thermodynamically stable for a time sufficient for a desired degree of growth. Advantageously, the patterned placement of crystalline seeds and disclosed processes allow for production of various morphologies of synthetic diamonds, including octahedral and cubic diamonds, and improved growth conditions generally. As a result, the grown superabrasive particles typically have a high yield of high quality particles and a narrow distribution of particle sizes.

US20080044339A1: Thick single crystal diamond layer method for making it and gemstones produced from the layer

Applicant: -
Publication: 2008-02-21
Filed: 2007-03-05
Status: application

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

US20080043220A1: Laser marking system

Applicant: Lazare Kaplan International
Publication: 2008-02-21
Filed: 2007-09-04
Status: application

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

US20080038997A1: Method of Working Gemstones

Applicant: -
Publication: 2008-02-14
Filed: 2006-11-30
Status: application

The invention provides a method of gemstones working enabling rapid gemstone working member exchange and gemstone processing sequence continuation without the need to level the gemstone or the working member. The invention also provides a rotatable support having an axis of rotation and a registering feature. The registering feature precisely positions and aligns an interchangeable abrading article so that its working surface rotates in a predetermined plane, which has fixed position relative to the gemstone.

US7336347: Methods, apparatus, and systems for evaluating gemstones

Applicant: American Gem Society, United States of America
Publication: 2008-02-26
Filed: 2004-12-20
Status: granted

Methods for grading gemstones, apparatus for grading gemstones, and systems that utilize such methods and apparatus, specifically methods which trace rays through a computer representation of a gemstone wherein the rays enter the gemstone through the gemstone crown and allow a grade to be assigned to the gemstone represented based on the ray paths through the representation.

US7332727: Method and device for generating ultra-high pressure

Applicant: Tokai University Educational System, Japan
Publication: 2008-02-19
Filed: 2002-10-31
Status: granted

pressure source material is loaded into a space having constraint device 1, which is formed partly by optically transparent material 1a, 1b, and is disrupted under volume constraint. Light energy is externally supplied to the pressure source material constrained in the space through the optically transparent material by employing the device to apply light energy. The disruption of atomic bonds in the pressure source material is induced by heating through the supplied energy. Exceptionally high pressures are generated in the space by the use of expansive forces arising from the disruption of atomic bonds. Such a configuration can implement ultrahigh pressure abilities that have not been achieved, so far.

JP2007252684A2: Cutting structure of jewelry

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

Problem to be solved: To provide novel cutting structure of jewelry, in which a virtual image of a cut shape made by reflection of a cut shape formed on a pavilion side is integrally come up with the cut shape on the pavilion side when it is viewed from a table direction.

Solution: Top parts of five basic cut faces are formed so as to converge toward the bottom of the pavilion. Adjoining basic cut faces share adjoining sides and so on. Small cutting is applied along the shared sides toward a culet 16 so that a star shape is made by an outline formed of a group of small cut faces.

JP2007296194A2: Diamond and its machining method

Applicant: Crossfor
Publication: 2007-11-15
Filed: 2006-05-01
Status: application

Problem to be solved: To provide diamond and its machining method for markedly improving the reflectance of pavilion while reducing the cut amount of diamond.
Solution: The diamond 1 is formed with a reflecting layer 5a at least at a part of the surface of pavilion 5 to reflect incident light on the internal side. The diamond 1 is preferably machined to cut a part other than the pavilion 5 into desired shape after the reflecting layer for reflecting the incident light inside is formed at the whole diamond in a half-machined state formed only with the pavilion 5 by cutting.

JP2007230807A2: Method of producing diamond product

Applicant: Allied Material Corp
Publication: 2007-09-13
Filed: 2006-02-28
Status: application

Problem to be solved: To provide a method of producing a diamond product less in surface defects even if a diamond shape is complicated when the diamond product having the single crystal diamond is produced.

Solution: When a diamond is polished, the diamond is mechanically polished, and thereafter, microcracks in the surface of the diamond is removed by bringing a copper plate, on which copper oxide is formed by heating in atmosphere, into static contact with the diamond, and keeping the contact state for a prescribed time to wear the diamond. Thereby, a high quality diamond product can be produced. The surface roughness of the copper plate is preferably not larger than the surface roughness of the mechanically polished diamond.

WO08053267A2: Virtual whole diamond creations from plurality of stones and having homogenous table

Applicant: -
Publication: 2008-05-08
Filed: 2006-11-02
Status: application

The uniqueness of this invention is the duplication of an actual full cut diamond or other precious stones by assembling a plurality of stones cut with specific angles with a precision of 1 millionth of an inch and being assembled in a special setting so that the final jewelry piece has the look of one whole cut diamond or other precious stone.

Another unique feature of the invention provides for the homogeneity of the stones table surface and appearing essentially invisible. The purpose of this invention was and is; to create the look and replication of a round brilliant or other various shape diamonds and other precious stones, in which the total carat weight used in the creation of the Virtual Diamond or other precious stones, is considerably less than what is now required to get the same shape and look of current methods utilized in cutting diamonds into their final shape for setting into a piece of jewelry. The embodiment of this invention is of a two fold nature; one, is the ability to utilize a plurality of smaller cut stones which for the

same quality and clarity of larger stones, are far less expensive and therefore have a very significant commercial mass market appeal; Two, the actual look or size of the diamond or other precious stone creation will be several times the actual size of the carat weight of a conventionally cut whole stone. These Virtual Stone Creations with their included setting can then be mixed and matched to create a large variety of jewelry creations such as rings, earrings, necklaces, bracelets, pins, broaches, anklets, etc...

AT0009882U1: Verfahren zur herstellung eines schmuckstückes

Applicant: Swarovski & Co Austria
Publication: 2008-05-15
Filed: 2007-02-07
Status: utility model with search report

WO08062402A2: Gemstone constructions particularly useful for diamonds

Applicant: -
Publication: 2008-05-29
Filed: 2007-11-15
Status: application

A gemstone construction, comprising a plurality of individual gemstones assembled together by a common frame to define a composite gemstone unit having a girdle, a crown on one side of the girdle, and a pavilion on the opposite side of the girdle, each of the individual gemstones defining a segment of the composite gemstone unit, and including a girdle segment of the composite gemstone unit girdle, a crown segment of the composite gemstone unit crown, and a pavilion segment of the composite gemstone unit pavilion, the girdle and crown segments of at least some of the individual gemstones having an outer face to serve as the outer face of the composite gemstone unit girdle and crown, the girdle segment of at least some of the individual gemstones having at least one flat, smooth, inner face in contact with a corresponding flat, smooth, inner face of the girdle segment of another individual gemstone in the composite gemstone unit, the common frame engaging the girdle segments of the individual gemstones to press the flat, smooth, inner faces of the individual gemstones into firm contact with each other such that the composite gemstone unit appears substantially seamless to the naked eye.

US20080118966A1: Luminescent diamond particles

Applicant: Academia Sinica, Nan-Kang, Taiwan
Publication: 2008-05-22
Filed: 2007-11-13
Status: application

A method for preparing luminescent diamond particles (e.g., fluorescent nanodiamonds). The method includes irradiating diamond particles with an ion beam and heating the irradiated diamond particles in a non-oxidizing atmosphere at a temperature between 600

and 1000° C. The diamond particles have a diameter of 1 nm to 1 mm and the ion beam has a kinetic energy of 1 KeV to 900 MeV. Also disclosed are luminescent diamond particles prepared by this method and methods of using them.

US7382528: Gem microscope having a swivel base and a stationary power cord

Applicant: Gemological Institute of America, CA, United States of America
Publication: 2008-06-03
Filed: 2005-11-30
Status: granted

A gem microscope includes a base structure that supports the microscope stage, focus column, and optical head. The base structure includes a lower component that receives a power cord; the lower component and the power cord remain stationary when the gem microscope is in use. The base structure also includes an upper component rotatably coupled to the lower component. The upper component can rotate around the lower component to enable convenient sharing of the gem microscope by a number of users. The base structure includes an electrical coupler assembly that maintains an electrical connection (for the gem microscope power supplies) throughout rotation of the gem microscope.

US7382445: Methods, apparatus, and systems for evaluating gemstones

Applicant: American Gem Society, NV, United States of America
Publication: 2008-06-03
Filed: 2004-12-20
Status: granted

Methods for grading gemstones, apparatus for grading gemstones, and systems that utilize such methods and apparatus are disclosed.

US7372552: Methods, apparatus, and systems for evaluating gemstones

Applicant: American Gem Society, NV, United States of America
Publication: 2008-05-13
Filed: 2004-12-20
Status: granted

Methods for grading gemstones, apparatus for grading gemstones, and systems that utilize such methods and apparatus are disclosed.

US7371280: High pressure crystal growth apparatuses and associated methods

Applicant: -
Publication: 2008-05-13
Filed: 2005-08-24
Status: granted

High pressure synthesis of various crystals such as diamond, cBN and the like can be carried out using reaction assemblies suitable for use in methods such as temperature gradient methods. The reaction assembly can be oriented substantially perpendicular to gravity during application of high pressure. Orienting the reaction assembly in this manner can avoid detrimental effects of gravity on the molten catalyst, e.g., convection, hence increasing available volumes for growing high quality crystals. Multiple reaction assemblies can be oriented in series or parallel, each reaction assembly having one or more growth cells suitable for growth of high quality crystals. Additionally, various high pressure apparatuses can be used. A split die design allows for particularly effective results and control of temperature and growth conditions for individual crystals.

US7368013: Superabrasive particle synthesis with controlled placement of crystalline seeds

Applicant: -
Publication: 2008-05-06
Filed: 2005-07-05
Status: granted

An improved method for synthesizing superabrasive particles provides high quality industrial superabrasive particles with high yield and a narrow size distribution. The synthesis method can include forming a growth precursor of a substantially homogeneous mixture of raw material and catalyst material or layers of raw material and metal catalyst. The growth precursor can have a layer of adhesive over at least a portion thereof. A plurality of crystalline seeds can be placed in a predetermined pattern on the layer of adhesive. The growth precursor can be maintained at a temperature and pressure at which the superabrasive crystal is thermodynamically stable for a time sufficient for a desired degree of growth. Advantageously, the patterned placement of crystalline seeds and disclosed processes allow for production of various morphologies of synthetic diamonds, including octahedral and cubic diamonds, and improved growth conditions generally. As a result, the grown superabrasive particles typically have a high yield of high quality particles and a narrow distribution of particle sizes.

EP1921049A1: High-hardness polycrystalline diamond and process for producing the same

Applicant: Sumitomo Electric Industries, Osaka, Japan
Publication: 2008-05-14
Filed: 2006-07-21
Status: application

There are provided sufficiently strong, hard, and heat resistant, dense and homogenous polycrystalline diamond applicable to cutting tools, dressers, dies and other working tools and excavation bits and the like, and a cutting tool having a cutting edge of the polycrystalline diamond. The polycrystalline diamond is formed substantially only of diamond formed using a composition of material containing a non diamond type carbon material, the composition of material being converted directly into diamond and sintered at ultra high pressure and ultra high temperature without aid of a sintering aid or a catalyst, and has a mixed microstructure having a fine crystal grain of diamond having a maximal grain size of at most 100 nm and an average grain size of at most 50 nm and a coarse crystal grain of diamond in the form of one of a platelet and a granule having a grain size of at least 50 nm and at most 10,000 nm.

US20080113588A1: Gemstone Polishing Device and Method of Polishing

Applicant: -
Publication: 2008-05-15
Filed: 2006-02-28
Status: application

A method of polishing diamonds held by a tang having a predefined axis orthogonal to polishing surface. The axis returns to its original spatial orientation with respect to the polishing surface at the end of each facet of the diamond polishing.

US20080123076A1: Systems and Methods for Ray Tracing

Applicant: -
Publication: 2008-05-29
Filed: 2006-11-28
Status: application

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

EP1465779B1: Anti-fraud method for protecting valuable stones

Applicant: -
Publication: 2008-05-28
Filed: 2002-12-20
Status: granted

A method of characterising a cut or uncut precious or semi-precious stone comprising the steps of acquiring a higher-than-optical resolution image of at least one irregularity at the boundary of two or more facets of a cut stone, said image being of resolution sufficiently high to define said at least one irregularity, said at least one irregularity being characteristic of the individual stone, digitising said image and storing the digitised image in association with an identifier of the stone.

US20080111085A1: Method and device for generating ultra-high pressure

Applicant: -
Publication: 2008-05-15
Filed: 2008-01-02
Status: application

A pressure source material is loaded into a space having constraint device, which is formed partly by optically transparent material and is disrupted under volume constraint. Light energy is externally supplied to the pressure source material constrained in the space through the optically transparent material by employing the device to apply light energy. The disruption of atomic bonds in the pressure source material is induced by heating the pressure source material above the boiling point thereof through the supplied energy. Exceptionally high pressures are generated in the space by the use of expansive forces arising from the disruption of atomic bonds. Such a configuration can implement ultrahigh pressure abilities that has not been achieved, so far.

JP2008018120A2: Two-staged pavilion decorative diamond

Applicant: Hohoemi Brains Inc
Publication: 2008-01-31
Filed: 2006-07-14
Status: application

Problem to be solved: To provide a two-staged pavilion decorative diamond, very bright and with a number of reflection patterns when the diamond is observed through a table facet and through a surface of a crown.

Solution: The diamond has the same crown as a round brilliant cut diamond, and has first and second pavilions divided by a horizontal dividing plane. A lower girdle facet and a pavilion main facet are bent by the horizontal dividing plane between the first and second pavilions, and the angle of the first pavilion is larger than the angle of the second pavilion. The two-staged pavilion decorative diamond sparkles more brilliantly than the conventional round brilliant cut diamond, and has double reflection patterns.

ES2301379AA: Mejoras introducidas en la patente de invencion p200500389 por "diamante sintetico de distintos colores personalizado a partir de queratina humana o animal (vivo o muerto). Procedimiento para su fabricacion".

Applicant: Inst de Monocristales, Spain
Publication: 2008-06-16
Filed: 2006-08-08
Status: Application with search report

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

EP1741360A4: OVAL CUT DIAMOND

Applicant: Hohoemi Brains Inc, Japan
Publication: 2008-06-18
Filed: 2005-03-25
Status: Supplementary search report

[From equivalent EP1741360A1] An oval-cut diamond comprises a girdle having a contour line in an oval or oval-like shape, a crown above the girdle having an octagonal table facet on a top of it and a pavilion below the girdle. That is a modified oval brilliant cut diamond, in which one of the crown and the pavilion is rotated by about a sixteenth revolution around its central axis from an ordinary brilliant cut diamond. The girdle is of a ratio (b/a) of a short radius to a long radius of 0.6 or more, in which a radius in long axis direction is "a", and a radius in short axis direction is "b". A pair of pavilion main facets positioned opposite to each other with respect to the central axis has a pair of crown main facets or star facets facing the pair of pavilion main facets through the girdle. The two pavilion main facets, the two crown main facets or star facets and the table facet have a common vertical plane within the facets so that brilliancy of reflection lights coming out of the table facet and crown facets is enhanced.

EP1741359A4: OVAL CUT DIAMOND

Applicant: Hohoemi Brains Inc, Japan
Publication: 2008-06-18
Filed: 2005-03-25
Status: Supplementary search report

[From equivalent EP1741359A1] An oval-cut diamond comprises a girdle having a contour line in an oval or oval-like shape, a crown above the girdle having an octagonal table facet on a top of it and a pavilion below the girdle. The girdle is of a ratio (b/a) of a

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

US20080148772A1: Precious and Semiprecious Stone Cut

Applicant: -
Publication: 2008-06-26
Filed: 2006-04-19
Status: application

The present invention provides a cut stone including a top surface and a bottom surface and a girdle. The top surface includes a first facet row having 18 facets, a second facet row having 6 facets, and a third facet row having 6 facets. The bottom surface includes a first facet row having 18 facets, a second facet row having 6 facets, and a third facet row having 6 facets. The girdle is disposed between the first facet row of the top surface and the first facet row of the bottom surface.

US20080157096A1: SYSTEM AND METHOD FOR PRODUCING SYNTHETIC DIAMOND

Applicant: Apollo Diamond, United States of America
Publication: 2008-07-03
Filed: 2008-03-13
Status: application

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

US20080156256A1: System and method for producing synthetic diamond

Applicant: Apollo Diamond, United States of America
Publication: 2008-07-03
Filed: 2008-03-13
Status: application

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

US20080138605A1: Complex body and method of synthesis of diamond thin layer

Applicant: -
Publication: 2008-06-12
Filed: 2007-11-21
Status: application

There are provided a process for synthesizing a diamond thin film on a glass substrate with a high coverage even when using ordinary multi-component glass having a low glass transition point as a material of the glass substrate, and a composite article obtained by laminating the diamond thin film on the glass substrate. The present invention relates a composite article comprising a glass substrate and a diamond thin film laminated on the glass substrate, wherein the glass substrate is made of multi-component glass, and a coverage of diamond over the glass substrate is 50% or more; as well as a process for synthesizing a diamond thin film on a glass substrate made of multi-component glass in a closed chamber provided therein with a heating means, said process comprising the steps of introducing hydrogen and a liquid carbon source as a carbon source for the diamond thin film into the closed chamber; and heating the contents of the closed chamber by the heating means to evaporate carbon from the liquid carbon source and deposit the evaporated carbon as diamond on the glass substrate.

US20080160191A1: Method and Equipment of Producing Graphite and Metallic Catalyst Composite for Diamond Synthesis

Applicant: Jiangsu Tianyi Micro Metal Powder Co., China
Publication: 2008-07-03
Filed: 2007-12-28
Status: application

This invention releases the preparation method and equipment of graphite and catalyst composite for a kind of synthetic diamond. Firstly the clean graphite particle shall be placed into the heating chamber for pre-heating, the lower limit of the heating temperature shall be higher than the boiling point of the coated carbonyl metal complex and the upper limit of the heating temperature shall be set according to the thickness of the coating needed; secondly, the heated graphite particle will be fed into the coating room with vibrator or agitator and the steam of carbonyl metal complex shall be input for coating; finally the coated graphite particle shall be fed into the cooling and passivation

room for cooling and passivation of the discharging materials or enter the next round circle of heating and coating. As to the graphite and catalyst composite prepared by this invention, the surface of each graphite particle is plated with metal layer and the continuous metallic contact is formed between the particles of the synthetic cylinder prepared by it. In synthesis, it is easy to form the continuous metallic film so as to continuously feed the carbon to the diamond crystal nucleus to promote the crystal nucleus growing into perfect diamond crystal.

US20080145299A1: Personalized Synthetic Diamond of Different Colours, Obtained From (Living or Dead) Human or Animal Keratin and Production Method Thereof

Applicant: Instituto De Monocristales, Spain
Publication: 2008-06-19
Filed: 2005-08-16
Status: application

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

US7388656: Method and system for color grading of gemstones

Applicant: -
Publication: 2008-06-17
Filed: 2005-12-30
Status: granted

A method and system, including a computer program product, implementing a color terminology for accurate color grading of gemstones are provided. The method includes generating a reference color to match that of a graded gemstone under the standard viewing environment, processing color data in different color spaces, assigning a color grade to specify the color of the gemstone graded. The reference color can be continuously changed by adjusting the hue, lightness and saturation values. The color grade comprises a color name and one or more corresponding color coordinates and/or one or more corresponding color notations, in the form of Color Name (Color Coordinates). The color name is used for verbal description of the color, and the color coordinate or color notation is for accurate color communication in the jewelry industry.

JP2008010438A2: Diamond single crystal with thin film and manufacturing method thereof

Applicant: Sumitomo Electric Ind Ltd
Publication: 2008-01-17
Filed: 2006-06-27
Status: application

Problem to be solved: To provide a manufacturing method of a diamond single crystal with a low resistance phosphorus-doped diamond thin film in which phosphorous having less variation in resistivity is doped at high concentration, and the diamond single crystal with a low resistance phosphorus-doped diamond thin film.

Solution: A method is used for growing a low resistance phosphorous-doped diamond epitaxial thin film having a resistivity of not more than 300 Ωcm on a main surface of a {111} single crystal substrate, in condition that a proportion of phosphorous atoms and carbon atoms is 3% or more in a material gas. In this method, an off-angle of the main surface is 0.50°-2.75°. Also, in a diamond single crystal with a low resistance phosphorus-doped diamond thin film, an off-angle of a main surface of the {111} single crystal substrate is 0.50°-2.75°, and a resistivity of a low resistance phosphorous-doped diamond epitaxial thin film is not more than 300 Ωcm .

JP2008023181A2: Method of numerical determination of degree of painting and/or digging-out of diamond

Applicant: CENTRAL GEM LABORATORY
Publication: 2008-02-07
Filed: 2006-07-24
Status: application

Problem to be solved: To determine the grade of a diamond by finding the presence of painting or digging-out or numerically finding the degree of the painting or digging-out, if any, in the polished shape formed on the girdle in the boundary between the crown and the pavilion in the brilliantteering process of the diamond.

Solution: In order to determine the degree of the girdle, the angle between an upper girdle facet and a bezel, the angle between upper-girdle facets and the angle between a lower-girdle facet and a pavilion main facet can be found by a non-contact dimension measuring machine and the computations by a computer based on the dimension data measured by the dimension measuring machine.

GB2424903B2: Method of incorporating a mark in cvd diamond

Applicant: Element Six Ltd
Publication: 2008-06-25
Filed: 2004-12-10
Status: granted

From equivalent GB2424903A1. 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.

US20080188961A1: Gemstone weight calculating method and system

Applicant: -
Publication: 2008-08-07
Filed: 2007-02-06
Status: application

A method of calculating a weight of a gemstone via an electronic device by selecting at least one gemstone characteristic from a list of predetermined gemstone characteristics wherein the device calculates a weight of a gemstone by processing the at least one gemstone characteristic within a gemstone weight algorithm and displays the resulting weight on the electronic device. The gemstone characteristics include a gemstone type, a gemstone shape, a gemstone outline, a gemstone girdle and a gemstone bulge. In addition, a user of the method enters a gemstone size into the electronic device. A user may select in which order he/she selects a gemstone characteristic or enters a gemstone weight and may navigate to and from each characteristic. Once the user selects the appropriate gemstone characteristics, a gemstone weight algorithm performs the appropriate calculations so as to determine the weight of the gemstone. Thus, a person need not manually perform the calculations associated with calculating a weight of a gemstone.

US20080184739A1: Gemstone setting including a gem faceted to display a plurality of images from an outer focal region

Applicant: -
Publication: 2008-08-07
Filed: 2007-02-07
Status: application

The present invention includes gemstone settings and methods of manufacturing gemstone settings including a primary gem capable of displaying a plurality of images corresponding to one or more objects placed within in a focal region outside of the primary gem. The plurality of images is displayed by flattening the bottom of the primary

gem and faceting the crown to specifications that allow light to pass through the gem and not substantially reflect against a faceted pavilion.

US7398658: Gemstone marking system and method

Applicant: -
Publication: 2008-07-15
Filed: 2004-01-15
Status: granted

Diamonds are marked by applying apertured stencils bearing identifying indicia to the girdles, applying a fusible coating material over the apertured stencils, and then heating the coating material to fuse the material on the girdles. The stencils can be eliminated, and the indicia can be formed by directing a source of radiant energy at the coating material, and by moving the source and/or the girdle relative to each other.

WO08090511A1: Plasma etching of diamond surfaces

Applicant: Element Six Limited, United Kingdom; Donald Heather June South Africa
Publication: 2008-07-31
Filed: 2008-01-22
Status: application

The present invention relates to a method of producing a diamond surface including the steps of providing an original diamond surface, subjecting the original diamond surface to plasma etching to remove at least 2 nm of material from the original surface and produce a plasma etched surface, the roughness R_q of the plasma etched surface at the location of the etched surface where the greatest depth of material has been removed satisfying at least one of the following conditions: R_q of the plasma etched surface is less than 1.5 times the roughness of R_q of the original surface, or R_q of the plasma etched surface is less than 1 nm.

WO08088848A1: Enhanced diamond polishing

Applicant: Apollo Diamond, United States of America
Publication: 2008-07-24
Filed: 2008-01-17
Status: application

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

WO08087610A1: Polycrystalline diamond elements having convex surfaces; method of cutting a rotational symmetrical surface of a diamond element using a laser; method of polishing a spherical surface of a polycrystalline or coated diamond element

Applicant: Element Six Limited, United Kingdom; Donald Heather June South Africa
Publication: 2008-07-24
Filed: 2008-01-18
Status: application

A diamond element having a convex surface is disclosed, the convex surface including a spherical segment for which the maximum peak to valley deviation from a perfect spherical surface is less, than about 5 μ m. The diamond element may be a solid polycrystalline diamond material and/or may comprise base material which is coated with diamond. Alternatively or in addition, the RMS deviation from a perfect spherical surface may be less than about 500 nm, or the RMS roughness less than about 30 nm. A diamond element with a radius of curvature less than about 20 mm is also disclosed. In one aspect a diamond element having a conical half- angle greater than about 10° is described. Diamond elements of this type are intended for use as metrology tips. Key to this invention is the realization that a diamond surface, particularly a diamond surface with low Ra (roughness) and which is free of defects such as pits, digs and scratches, accumulates less material from the surface being measured, and thus provides a longer life.

US20080187479A1: Method of Producing Ultra-Hard Abrasive Particles

Applicant: -
Publication: 2008-08-07
Filed: 2006-05-04
Status: application

The invention relates to a method for debinding and/or purifying granules or material suitable for use in High Pressure High Temperatures diamond or cubic boron nitride synthesis, the method comprising the steps of passing the granules or material through a zone having controlled atmosphere and temperature in a continuous manner, the zone having a maximum temperature within the zone of greater than approximately 600° C, wherein the time spent by each granule within the zone is less than 30 minutes.

US20080170981A1: Enhanced diamond polishing

Applicant: -
Publication: 2008-07-17
Filed: 2007-01-17
Status: application

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

US7407549: Diamond single crystal composite substrate and method for manufacturing the same

Applicant: Sumitomo Electric Industries Ltd., Japan
Publication: 2008-08-05
Filed: 2004-11-04
Status: granted

A diamond single crystal composite substrate which are constructed from a plurality of diamond single crystal substrates with uniform plane orientations disposed side by side and integrated overall by growing diamond single crystals thereon by vapor phase synthesis, in which the deviation of the plane orientation of the main plane of each of said plurality of diamond single crystal substrates, excluding one diamond single crystal substrate, from the {100} plane is less than 1 degree, the deviation of the plane orientation of the main plane of the excluded one substrate from the {100} plane is 1 to 8 degrees, said one diamond single crystal substrate is disposed in the outermost circumferential part when the diamond single crystal substrates are disposed side by side, and is disposed so that the <100> direction in the main plane of said one substrate faces in the outer circumferential direction of the disposed substrates, and diamond single crystals are then grown by vapor phase synthesis so that the diamond single crystal grown from said one diamond single substrate is caused to cover the diamond single crystals grown on the other substrates, to achieve an overall integration.

US7399358: Synthesis of large homoepitaxial monocrystalline diamond

Applicant: -
Publication: 2008-07-15
Filed: 2006-09-01
Status: granted

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

EP1953273A2: Method of incorporating a mark in CVD diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2008-08-06
Filed: 2004-12-10
Status: application

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

US20080160191A1: Method and Equipment of Producing Graphite and Metallic Catalyst Composite for Diamond Synthesis

Applicant: Jiangsu Tianyi Micro Metal Powder Co., Ltd., China
Publication: 2008-07-03
Filed: 2007-12-28
Status: application

This invention releases the preparation method and equipment of graphite and catalyst composite for a kind of synthetic diamond. Firstly the clean graphite particle shall be placed into the heating chamber for pre-heating, the lower limit of the heating temperature shall be higher than the boiling point of the coated carbonyl metal complex and the upper limit of the heating temperature shall be set according to the thickness of the coating needed; secondly, the heated graphite particle will be fed into the coating room with vibrator or agitator and the steam of carbonyl metal complex shall be input for coating; finally the coated graphite particle shall be fed into the cooling and passivation room for cooling and passivation of the discharging materials or enter the next round circle of heating and coating. As to the graphite and catalyst composite prepared by this invention, the surface of each graphite particle is plated with metal layer and the continuous metallic contact is formed between the particles of the synthetic cylinder prepared by it. In synthesis, it is easy to form the continuous metallic film so as to continuously feed the carbon to the diamond crystal nucleus to promote the crystal nucleus growing into perfect diamond crystal.

US20080170385A1: Method and Apparatus for Object Viewing, Observation, Inspection, Identification, and Verification

Applicant: -
Publication: 2008-07-17
Filed: 2008-03-14
Status: application

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

US7408635: Optical measurement method and device

Applicant: National Institute of Advanced Industrial Science and Technology, Japan
Publication: 2008-08-05
Filed: 2004-09-03
Status: granted

An optical measurement of a crystalline sample to be measured. The sample is irradiated with an exciting light from the polarization direction in which the Raman scattering is prohibited by the selection rule. When a metal probe is brought to proximity to the sample to be measured, the selection rule is eased locally only in the proximity portion near the probe end in order that Raman scattering becomes active. Thus, a Raman signal only from the proximity portion near the probe end is detected. An optical measurement apparatus having an optical arrangement for measuring a signal light re-emitted from a sample to be measured when the sample is irradiated with an exciting light is provided. The optical measurement apparatus comprises a means for limiting the polarization state of the exciting light or signal light and a means for bringing a metal probe near the sample to be measured. The optical measurement apparatus is used to measure the signal light obtained by locally easing the limitation on the polarization state by bringing the metal probe near the sample. Therefore, Raman scattering light from silicon or the like can be measured with high space-resolution exceeding the light diffraction limit.

US20080160295A1: Method for adjusting ablation threshold

Applicant: Picodeon Ltd Oy
Publication: 2008-07-03
Filed: 2007-04-12
Status: application

The invention pertains to a method for lowering the ablation threshold of a laser-ablated material by having on a surface of the laser-ablated material a structuring which reduces the reflection of a laser beam. The ablation threshold can be further lowered by heating the material as well as by chemically modifying the material or its surface, even slightly. The invention facilitates industrial implementation of machining of a number of various surfaces and materials. The invention also pertains to target materials to be ablated.

JP2008054838A2: Diamond

Applicant: Komiya
Publication: 2008-03-13
Filed: 2006-08-30
Status: application

Problem to be solved: To provide a diamond capable of visualizing a star pattern and five heart patterns surrounding the star pattern.

Solution: The diamond has: first pavilion facets of five nearly diamond-shaped faces formed adjacently by combining acute angle parts positioned on dividing lines which divide the whole surface into five with a culet in the center with the respective tips of two edges of a dividing line B; second pavilion main facets of ten nearly diamond-shaped faces formed consecutively and adjoining alternately by combining an acute angle part positioned on a girdle and respectively one lower edge at the center of a position where the dividing line A and the dividing line B contact the girdle with one upper edge of each first pavilion facet as one lower edge and with the dividing line A as the other lower edge; and lower girdle facets of 20 nearly triangle faces formed consecutively and adjoining alternately while being surrounded by the upper edge of each second pavilion main facets, the dividing line B and the girdle.

JP2008018121A2: Two-staged pavilion decorative diamond

Applicant: Hohoemi Brains Inc
Publication: 2008-01-31
Filed: 2006-07-14
Status: application

Problem to be solved: To provide a two-staged pavilion decorative diamond, very bright and with a number of reflection patterns when the diamond is observed through a table facet and through a surface of a crown.

Solution: The diamond has the same crown as a round brilliant cut diamond, and has first and second pavilions divided by a horizontal dividing plane. The second pavilion is an octagonal pyramid, and the side surface is a second pavilion main facet. The first pavilion is a truncated hexadecagonal pyramid whose apex face is placed on the horizontal dividing plane, and the side surface is a first lower girdle facet. A first pavilion main facet extends from a girdle to the second pavilion main facet through the first lower girdle

facet. The two-staged pavilion decorative diamond sparkles more brilliantly than the conventional round brilliant cut diamond, and has double reflection patterns.

JP2008027412A2: Ono special

Applicant: Ono Naosuke
Publication: 2008-02-07
Filed: 2006-07-21
Status: application

Problem to be solved: To make a customer decide quality and a price in order to obtain satisfaction of the quality and the price from the customer.

Solution: A sale price and a delivery critical price are created by a personal computer based on quality 4C of diamond and desires of the customer are met at a maximum. As for a supplier, environment for selecting the supplier from among several companies is prepared in consideration of strong points and weak points as well. A dealer makes a sale without having inventory.

US20080190139A1: Precious, semiprecious or mineral cut stone, and the method of cutting same

Applicant: -
Publication: 2008-08-14
Filed: 2006-05-19
Status: application

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

FR2912240A1: Procédé de rendu d'images en temps réel de modèles en trois dimensions de pièces de joaillerie

Applicant: Vision Numeric Sa France
Publication: 2008-08-08
Filed: 2007-02-01
Status: application

Procédé de rendu d'images en temps réel de modèles en trois dimensions de pièces de joaillerie comprenant au moins une pierre (S) transparente ou translucide comprenant des facettes, comprenant les étapes consistant à déterminer un point de référence dans la pierre, calculer les composantes des normales aux facettes de la pierre dans un ensemble discret de directions autour du point de référence, et stocker ces composantes dans une

carte des normales, simuler des réflexions de la lumière à l'intérieure de la pierre en calculant une approximation du point d'intersection d'un rayon et de la pierre en utilisant une forme géométrique simplifiée de la pierre, et en utilisant, pour calculer la direction du rayon réfléchi, une normale extraite de la carte des normales, correspondant au point de la surface de la pierre situé dans la direction du point par rapport au point de référence.

EP1959780A1: Enhancing the optical characteristics of a gemstone

Applicant: California Inst of Techn, United States of America

Publication: 2008-08-27

Filed: 2006-12-06

Status: application

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

WO08102361A2: A method for evaluation of a gemstone

Applicant: Galatea Ltd. Israel

Publication: 2008-08-28

Filed: 2008-02-21

Status: application

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

WO08099422A2: Method and apparatus for producing single crystalline diamonds

Applicant: -

Publication: 2008-08-21

Filed: 2008-02-13

Status: application

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

WO08096314A2: Polycrystalline diamond (pcd) materials

Applicant: Element Six (Production) Ltd, South Africa
Publication: 2008-08-14
Filed: 2008-02-05
Status: application

The invention is for a polycrystalline diamond material comprising a first phase of bonded diamond particles and a second phase interspersed through the first phase. The second phase contains vanadium in the form of the metal or vanadium carbide or vanadium tungsten carbide or two or more of these forms and may be present in the polycrystalline diamond material in the range 1 to 8 percent by mass of the material.

US20080190356A1: Method and apparatus for producing single crystalline diamonds

Applicant: -
Publication: 2008-08-14
Filed: 2007-02-14
Status: application

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

US7420657: Methods, apparatus, and systems for evaluating gemstones

Applicant: American Gem Society, United States of America
Publication: 2008-09-02
Filed: 2004-12-20
Status: granted

A computer-implemented method, comprising:

generating a representation corresponding to an illuminated image of a gemstone viewed from an observation location, wherein said representation differentiates between light rays incident on said gemstone from a first range of incident angles and light rays incident on said gemstone from a second range of incident angles; evaluating said gemstone based on light rays said gemstone directs to said observation location which were incident on said gemstone from an angle within said first range of incident angles; and providing results from said evaluating to a user; wherein said gemstone is evaluated based on light rays of a first wavelength said gemstone directs to said observation location which were incident on said gemstone from an angle within said first range of incident angles and on light rays of a second wavelength the gemstone directs to said observation location which were incident on said gemstone from an angle within said first range of incident angles

US7414709: Method and system for online evaluation of gemstones

Applicant: GemEx Systems, Inc., United States of America
Publication: 2008-08-19
Filed: 2006-01-17
Status: granted

An online method and system for evaluating a gemstone is provided that enables a consumer to use a personal computer to evaluate the visual appearance and measurement data of the gemstone by emulating the laboratory instruments that previously collected the data for the gemstone. The computer is connected to the internet and a website that is linked to a gemstone database, emulation software and graphical user interface. The consumer identifies the specific gemstone he or she wants to evaluate, and an interactive gemstone certificate screen is displayed. The consumer separately selects and then emulates a variety of lab instruments, such as color and clarity grading, geometric measuring, and light performance and light ray tracing instruments. Graphical images and data pertaining to the selected gemstone are displayed on the computer monitor, and selected portions of the database are downloaded and saved on the computer memory.

US7411663: Apparatus for generating data for determining a property of a gemstone

Applicant: Overseas Diamonds Technologies, Belgium
Publication: 2008-08-12
Filed: 2006-09-01
Status: granted

An apparatus configured to generate image data for use in determining a property of a gemstone is disclosed. The apparatus includes a support structure configured to support the gemstone at an observation position such that an axis of symmetry of the gemstone is substantially parallel to an axis of rotation of the apparatus, a light source, including a reflector having a concave surface arranged to reflect a spatially varied light pattern generally towards the observation position, the concave surface including at least one relatively reflective region and at least one relatively unreflective region and is configured to generate the light pattern, where the length of a boundary between the relatively reflective region and the relatively unreflective region is greater than the radial distance between the center and an edge of the concave surface, and a rotator configured to rotate the gemstone relative to the light pattern substantially about the axis of rotation.

EP1723086B1: Method of incorporating a mark in cvd diamond

Applicant: Element Six Limited, United Kingdom
Publication: 2008-09-03
Filed: 2004-12-10
Status: granted

A method of incorporating a mark of origin or fingerprint in a CVD single crystal diamond material, which 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 one or more chemical dopants into the synthesis process in order to produce the mark of origin or fingerprint in the synthetic diamond material, which 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 viewing conditions.

EP1292726B1: Single crystal diamond prepared by cvd

Applicant: Element Six Ltd, South Africa
Publication: 2008-09-03
Filed: 2001-06-14
Status: granted

A single crystal diamond layer prepared by CVD and having at least one of the following characteristics:

a $\mu\tau$ product measured at 300 K greater than $1.5 \times 10^{-6} \text{cm}^2 \text{V}^{-1}$ where μ is the mobility and τ is the lifetime of the charge carriers; an electron mobility (μ_e) measured at 300 K greater than $2400 \text{cm}^2 \text{V}^{-1} \text{s}^{-1}$; a hole mobility (μ_h) measured at 300 K greater than $2100 \text{cm}^2 \text{V}^{-1} \text{s}^{-1}$; and a high collection distance greater than $150 \mu\text{m}$ measured at an applied field of $1 \text{V}/\mu\text{m}$ and 300 K; with the proviso that the diamond layer does not have a thickness of 2mm or greater.

US20080204705A1: Apparatus and method for color measurement and color grading of diamonds, gemstones and the like

Applicant: -
Publication: 2008-08-28
Filed: 2007-02-23
Status: application

The present invention discloses an apparatus and method for color measurement and color grading of faceted gemstones, diamonds and the like. The apparatus comprises a spectrometer, a computer, and a dual integrating sphere measurement arrangement comprising a measurement integrating sphere, a sample integrating sphere, a sample platform, a filter, a lens system, a baffle and a light source. The measurement geometry of the dual integrating sphere measurement arrangement is diffuse illumination and 8 degree viewing with the specular component excluded, plus diffuse white background provided by the sample integrating sphere. The sample integrating sphere encloses a sample to provide a constant environment for simulating the visual color grading environment. A novel three-step calibration insures an accurate spectral measurement of the sample inside the measurement integrating sphere. The computer controls the spectrometer and provides measurement parameters calculated from the physical parameters of the measured sample, including, but not limited to, shape, dimensions, refractive index, intensity of fluorescence and cut grade. The computer then calculates the spectral reflectance and calorimetric data, and determines an average color grade by checking a look-up-table that represents the relationship between the CIELAB coordinate and the average color grade. The computer also determines a true color grade based upon the average color grade and the physical parameters, using mathematical analyses and algorithms.

JP2008094634A2: Method for producing diamond particle whose cut surface is colored and method for producing diamond particle on whose cut surface pattern is drawn

Applicant: Tokyo Metropolitan Ind. Techn.Research Institute, Univ of Yamanashi
Publication: 2008-04-24
Filed: 2006-10-05
Status: application

Problem to be solved: to provide a method for producing a diamond particle whose cut surface is colored; and to provide a method for producing a diamond particle on whose cut surface a pattern is drawn.

Solution: the method for producing the diamond particle whose cut surface is colored comprises irradiating a cut surface to be colored of a diamond particle 12 with high energy ions 13 at an acceleration energy within a range of 1-5 MeV and an irradiation quantity of ion within a range of 1×10^{12} - 1×10^{15} ions/cm² in a temperature range of ordinary temperature to about 200°C under a vacuum atmosphere of 10⁻³ to 10⁻⁴ Pa by using an ion accelerator. Further, the method for producing the diamond particle on whose cut surface a pattern is drawn comprises irradiating the cut surface with the high energy ions 13 after covering the cut surface with a mask or photoresist perforated into a character or mark shape.

AT0010093U1: Schmuckelement

Applicant: Swarovski & Co Austria
Publication: 2008-09-15
Filed: 2007-05-25
Status: Utility Model with search report

Schmuckelement

WO08107860A2: Diamond

Applicant: Element Six Limited, UK; Donald Heather June, South Africa
Publication: 2008-09-12
Filed: 2008-03-07
Status: application

The present invention relates to an HPHT method for synthesizing single crystal diamond, wherein a single crystal diamond seed having an aspect ratio of at least 1.5 is utilised. Single crystal diamond seeds having an aspect ratio of at least 1.5 and synthetic single crystal diamond which may be obtained by the method recited are also described.

US20080231833A1: Method for evaluation of a gemstone

Applicant: Galatea Ltd., Israel
Publication: 2008-09-25
Filed: 2008-02-21
Status: application

An apparatus for determining location of at least one inclusion in a gemstone having a first refractive index, comprising: a container adapted for containing a material having a second refractive index, a holder operative to support a gemstone in the material when the container contains the material; an illuminator positioned and adapted to illuminate said gemstone when disposed within said material in said container, with illumination at

which said gemstone and said material have their respective first and second indices; a detector that detects illumination from the illuminated gemstone and said material and produces signals responsive thereto; a controller that receives the signals and is operative to determine a location of an inclusion in the gemstone based on the signals; and a system, operative to reduce the presence within said material, at least when the gemstone is disposed therein, of any substance other than inclusions, having a third refractive index.

US20080225266A1: Gemstone viewing methods and apparatus

Applicant: Overseas Diamonds Technologies, Belgium
Publication: 2008-09-18
Filed: 2008-03-13
Status: application

A viewing apparatus for viewing a surface of a gemstone comprising an adjustable platform with a surface adapted to receive the gemstone is disclosed. The apparatus includes a viewing axis along which the gemstone is viewed, a light source to emit light substantially parallel to the viewing axis, and an adjustment mechanism having misalignment indicators, arranged to provide three or more visually distinguishable zones around the viewing axis. The adjustment mechanism also has three or more adjustment indicators positioned relative to the platform and the misalignment indicators, where the adjustment indicators are associated with the visually distinguishable zones such that an image viewed along the viewing axis of one of the zones reflected from the surface of the gemstone provides an indication of which way to adjust the platform relative to the viewing axis to make the surface of the gemstone perpendicular to the viewing axis.

US20080219914A1: Method of cladding diamond seeds

Applicant: -
Publication: 2008-09-11
Filed: 2006-05-26
Status: application

The invention relates to a method for manufacture of diamond, the method including the steps of providing a first coating of solvent metal or solvent metal alloy on a diamond seed to create a coated diamond seed, situating the coated diamond seed adjacent a catalyst system comprising a solvent metal and/or a source of carbon, and subjecting the coated diamond seed and catalyst system to increased temperature wherein the melting point of the first coating is at least 20 deg C. below that of the catalyst system. The invention further relates to a compact comprising a plurality of diamond seeds wherein at least one seed includes a first coating comprising a solvent metal and/or solvent metal based alloy, the compact further comprising a catalyst system comprising a solvent metal and/or a source of carbon wherein the melting point of the first coating is at least 20 deg C. below that of the catalyst system.

US20080218730A1: Methods, apparatus, and systems for evaluating gemstones

Applicant: -
Publication: 2008-09-11
Filed: 2008-05-22
Status: application

Gemstone evaluation method e.g. for diamond, involves acquiring image of gemstone that is illuminated with light from different directions, and analyzing acquired image to provide quality information

US20080226838A1: Plasma CVD apparatus and film deposition method

Applicant: Kochi Industrial Promotion Center, Japan; Casio Computer Co., Japan
Publication: 2008-09-18
Filed: 2007-12-21
Status: application

A plasma CVD apparatus includes a first electrode which is disposed in a reacting furnace and on which a substrate is mounted, a second electrode that is disposed above and opposite the first electrode and generates plasma with the first electrode, and a first gas supply nozzle that is disposed at a height between a height of the first electrode in the reacting furnace and a height of the second electrode, and has a plurality of ejection ports formed and arranged in such a way as to surround an area between the first electrode and the second electrode where plasma is generated.

JP2008063155A2: Method for manufacturing diamond structure and diamond structure

Applicant: Sumitomo Electric Ind Ltd
Publication: 2008-03-21
Filed: 2006-09-04
Status: application

Problem to be solved: To provide a method for manufacturing a diamond structure, by which relatively deep grooves, holes and perforations can be formed in diamond with a good precision.

Solution: A second layer to fifth layer included in a laminated body are formed from a material having resistance to wet-etching to a first layer, and the fifth layer is formed from a material having resistance to each dry-etching when dry etching is applied to each of the second layer to fourth layer.

JP2008110891A2: Diamond single crystal and its production method

Applicant: Sumitomo Electric Ind Ltd
Publication: 2008-05-15
Filed: 2006-10-31
Status: application

Problem to be solved: To provide a diamond single crystal suitable for mechanical applications such as cutting tools and wear-resistant tools and functional applications such as semiconductor materials, electronic components and optical components, and a production method thereof.

Solution: The diamond single crystal shows a peak absorption coefficient of 0.05-10 cm⁻¹ at a wavenumber of 1,332 cm⁻¹ (wavelength of 7.5 μm) across the entire crystal and is obtained by chemical vapor deposition synthesis. The composition ratios of elements in a vapor phase at the chemical vapor deposition synthesis of the single crystal is adjusted to achieve atomic concentrations of carbon to hydrogen of 2-10%, nitrogen to carbon of 0.1-6% and oxygen to carbon of 0.1-5%.

JP2008100035A2: Gemstone glittering with cat's-eye or star-shaped light effect and manufacturing method of the same

Applicant: Takada
Publication: 2008-05-01
Filed: 2007-03-05
Status: application

Problem to be solved: To provide a gemstone having a glittering structure with a cat's-eye or a star-shaped light effect so long as a jewel or a gem can be cabochon-cut, and also to provide a manufacturing method of the same.

Solution: On the non-cabochon side of a gemstone body that is cabochon-cut, there are provided, by uniform polishing, minute linear grooves that are perfectly parallel in a specific direction. This structure makes the cat's-eye glitter (lines) enhanced on the cabochon face.

EP1977659A1: Method for producing precious or semi-precious stones

Applicant: Cielo S.R.L., Italy
Publication: 2008-10-08
Filed: 2007-04-05
Status: application

A method for producing precious or semi-precious stones comprising the following steps is described: cutting and polishing of a rough crystal so as to obtain a polyhedron of cut crystal; gluing together of at least four polyhedrons of cut crystal so as to obtain a larger polyhedron; and cutting of the polyhedron of glued crystals so as to obtain a finished precious or semi-precious stone.

DE602004016394C0: Verfahren zum einbringen einer Markierung in einen CVD-Diamanten

Applicant: Element Six Ltd United Kingdom
Publication: 2008-10-16
Filed: 2004-12-10
Status: Granted European Patent

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

US20080241496A1: Diamond films and methods of making diamond films

Applicant: -
Publication: 2008-10-02
Filed: 2007-10-31
Status: application

The present invention provides films and substrates coated with films that comprise a nano-crystalline diamond matrix that is substantially free of graphite inclusions. The present invention also provides a method of chemical vapor deposition to prepare the films. The method of chemical vapor deposition operates at a DC bias voltage that substantially precludes the formation of a plasma ion capable of causing a region of a nano-crystalline diamond matrix within a forming film to allotrope when the plasma ion collides with the film.

US20080241480A1: Diamond films and methods of making diamond films

Applicant: -
Publication: 2008-10-02
Filed: 2007-10-31
Status: application

The present invention provides films and substrates coated with films that comprise a nano-crystalline diamond matrix that is substantially free of graphite inclusions. The present invention also provides a method of chemical vapor deposition to prepare the films. The method of chemical vapor deposition operates at a DC bias voltage that substantially precludes the formation of a plasma ion capable of causing a region of a nano-crystalline diamond matrix within a forming film to allotrope when the plasma ion collides with the film.

US20080241049A1: Ultrahard diamonds and method of making thereof

Applicant: Carnegie Institution of Washington
Publication: 2008-10-02
Filed: 2007-11-07
Status: application

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

US7435296: Diamond bodies grown on SiC substrates and associated methods

Applicant: -
Publication: 2008-10-14
Filed: 2006-04-18
Status: application

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

EP1983080A2: Single crystal diamond prepared by CVD

Applicant: Element Six (Pty) Ltd, South Africa
Publication: 2008-10-22
Filed: 2001-06-14
Status: Publ. of Application without search report

A single crystal diamond prepared by CVD and having one or more electronic characteristics; making the diamond suitable for electronic applications. Also provided is a method of making the single crystal CVD diamond.

EP1980846A1: Methods and systems for performing differential radiography

Applicant: Universiteit Gent, Belgium; ES-International N.V., Belgium

Publication: 2008-10-15

Filed: 2007-04-13

Status: application

The present invention relates to a characterisation system for characterising an object comprising a basic material and additional structural features. The system comprises at least one irradiation source for generating an irradiation beam for irradiating the object to be characterised and at least one detector for detecting said irradiation beam transmitted through the object. The system furthermore comprises a control means for obtaining at least two different basic images of the object for different configurations of the irradiation beam, the object and the detector. The latter may be obtained by shifting and/or rotating components and/or by selecting different components used for acquisition of the images. The system furthermore comprises an image processing means for combining said at least two different basic images as to obtain an at least two-dimensional differential image indicating the additional structural features of the object but substantially filtering out the basic material. The invention also relates to a corresponding method for characterising objects and to an image processing means for processing acquired images accordingly.

US7428051: Device for the IR-spectrometric analysis of a solid, liquid or gaseous medium

Applicant: Endress + Hauser Conducta Gesellsc. fur Mess-u. Regeltechnik, Germany

Publication: 2008-09-23

Filed: 2003-07-18

Status: granted

The invention relates to a device for the IR-spectrometric analysis of a solid, liquid or gaseous medium. The device includes a process probe, which has a reflection element. The device additionally includes a linear variable filter, at least one detector element, and a control/evaluation unit. At least one light source is also provided, the light of which is coupled into the reflection element via a collimating optics. At least one optical waveguide having a light input section and a light output section is provided. The light is guided via the light output section of the optical waveguide into a defined region of the linear variable filter. The detector element and the linear variable filter are arranged movably relative to one another over approximately the length of the linear variable filter. The control/evaluation unit determines the spectrum of the medium on the basis of the measured values delivered from the detector element.

WO08123801A1: Diamond cleaning method

Applicant: New Diamonds Of Siberia, Russian Federation
Publication: 2008-10-16
Filed: 2008-03-28
Status: application

The invention relates to producing natural diamonds having jewellery quality and can be used for integrally cleaning diamonds by removing surface impurities, mineral and organic remains inside cracks in diamonds and for improving purity and colour characteristics of natural diamonds. The inventive method consists in carrying out stage-to-stage treatment of a diamond with oxidising mixtures and in exposing the diamond to microwave radiation in autoclaves at high temperatures and pressure. At a first stage, a salt solution or a six-valent chromium oxide solution, the chromium concentration of which is of 0.5-2% by weight, diluted in 4-9H sulphuric acid is used in the presence of graphite oxidation catalysts and carbon-containing impurities in the form of metal salts and/or oxides selected from a group of silver, vanadium, manganese, molybdenum and copper, the concentration of which ranges from 0.1 to 0.5 % by weight. At the second stage, the diamond is treated with an oxidation mixture containing concentrated nitric, chlorohydric and fluorohydrogen acids with a component ratio ranging from 6:2:0.5-1 to 2:6:1-2, respectively. The invention makes it possible to totally removing mineral and carbon containing impurities, including graphite, from a diamond.

US20080240344A1: X-ray tomosynthesis device

Applicant: -
Publication: 2008-10-02
Filed: 2008-02-26
Status: application

X-ray tomosynthesis device includes a target and a device configured for directing a particle beam of electrically charged particles onto the target which emits X-ray radiation for irradiating a sample to be examined when the electrically charged particles strike the target, in use. The target includes at least one support element on which a plurality of mutually spaced target elements are provided, and each mutually spaced target element only partially covers the at least one support element. A deflection device is provided, and the deflection device is configured for causing the particle beam to be deflected in order to strike the plurality of mutually spaced target elements, in use.

JP04142547B2

Applicant: -
Publication: 2008-09-03
Filed: 2003-10-09
Status: application

Jewel e.g. diamond, cubic zirconia has rectangular surface with vertex that reaches girdle portion, in which base side is set in agreement with girdle portion

JP2008106597A2: Diamond recovery method from sea bottom sediment and its device

Applicant: Earth Technica
Publication: 2008-05-08
Filed: 2007-09-26
Status: application

Problem to be solved: To provide a diamond recovery method and its device capable of recovering diamond by a lower energy and highly efficient method, so as to be effectively performable on a marine ship, when recovering the diamond from sea bottom sediment.

Solution: A carrying object material including a shell and process water are carried in a crushing chamber containing a crushing medium. The carrying object material is vibrated in a state of being put in the crushing chamber for a predetermined staying time. The diamond taken in the shell is taken out, without damaging the diamond, by at least partially crushing the shell.

US20080271488A1: Oval shaped diamond cut having hearts and arrows pattern

Applicant: -
Publication: 2008-11-06
Filed: 2007-05-04
Status: application

An oval shaped diamond, adapted to display a hearts and arrows pattern when exposed to light characteristic of the hearts and arrows pattern in a round diamond, comprising: an oval shape having two long sides symmetrical to each other, two short sides symmetrical to each other and four corner sides symmetrically located between the long sides and the short sides respectively, eight main crown facets of unequal size and eight main pavilion facets of unequal size, sixteen pavilion half facets; a girdle of non-uniform thickness separating the crown and pavilion facets and two subsidiary pavilion facets in alignment with each other on the long sides of the diamond adjacent a main pavilion facet.

US20080271487A1: Triangular star shaped diamond having hearts and arrows pattern

Applicant: -
Publication: 2008-11-06
Filed: 2004-12-10
Status: application

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

US20080271486A1: Hexagon shaped diamond which displays hearts and arrows pattern

Applicant: -
Publication: 2008-11-06
Filed: 2007-05-04
Status: application

A hexagonal 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 hexagon shaped diamond should be cut to form six main crown facets of substantially equal size symmetrically arranged relative to one another surrounding a table facet with each main crown facet having parallel edges symmetrically aligned to the parallel edges of a main crown facet located opposite thereto, six main pavilion facets polished in alignment with the main crown facets, girdle facets separating the pavilion facets from the main crown facets and twelve crown star facets.

US20080271485A1: Triangular shaped diamond which displays hearts and arrows pattern

Applicant: -
Publication: 2008-11-06
Filed: 2007-05-04
Status: application

A triangular shaped diamond adapted to display a hearts and arrows pattern when exposed to light comparable to the hearts and arrows pattern in a round diamond, comprising: six main crown facets, twelve crown half facets, a table facet, six main pavilion facets and a plurality of girdle facets separating the crown facets from the pavilion facets with each main crown facet having a symmetrically positioned opposite crown facet of substantially equal size surrounding the table facet and having at least one edge in parallel alignment with a corresponding edge in the main crown facet opposite thereto.

US20080271484A1: Heart shaped diamond cut having hearts and arrows pattern

Applicant: -
Publication: 2008-11-06
Filed: 2007-05-04
Status: application

A heart shaped diamond possessing a hearts and arrows pattern characteristic comprising: six main crown facets symmetrically aligned relative to one another, with each of the six main crown facets having a straight edge in parallel alignment with a straight edge of another main crown facet disposed opposite thereto; six main pavilion facets aligned at a fixed given angle of approximately 60° to each other and having a symmetrical number of pavilion half facets such that the six main pavilion facets meet at a point corresponding to the symmetrical central of the diamond and a multiple number of crown star facets spaced apart from one another on the surface of the diamond. The pavilion half facets are arranged in pairs polished on the main pavilion facet with a first pavilion half facet in each pair lying at a first angle of preferably 26.25° relative to a second pavilion half facet in the same pair and with the second pavilion half facet in each pair cut at a second angle of preferably 33.75° relative to the first pavilion half facet in an adjacent pair with which it shares a common boundary.

ES2301379BA: Mejoras introducidas en la patente de invencion p200500389 por "diamante sintetico de distintos colores personalizado a partir de queratina humana o animal (vivo o muerto). procedimiento para su fabricacion".

Applicant: Inst de Monocristales, Spain
Publication: 2008-11-01
Filed: 2006-08-08
Status: granted

Mejoras introducidas en la patente de invención P200500389 por ¿diamante sintético de distintos colores personalizado a partir de queratina humana o animal (vivo o muerto). Procedimiento para su fabricación¿. Las mejoras consisten en la utilización, como materia prima para la obtención del diamante cultivado, de tejidos de cordón umbilical y/o la placenta de personas o animales, indistintamente vivos o muertos, sometándose dichos tejidos a un proceso de carbonización que, como en la patente principal, puede ser una carbonización de ácido fuerte, una carbonización por horno de mufla, o una carbonización por mechero bunsen, soplete o similar, obteniéndose en el primer caso el carbono mediante decantación, filtrado o centrifugado, y en los otros casos mediante un proceso mecánico de raspado en seco o, opcionalmente, raspado en húmedo seguido de secado.

WO08136923A2: Triangular shaped diamond which displays hearts and arrows pattern

Applicant: Sundiamond USA, United States of America
Publication: 2008-11-13
Filed: 2008-04-22
Status: application

A triangular shaped diamond adapted to display a hearts and arrows pattern when exposed to light comparable to the hearts and arrows pattern in a round diamond, comprising: six main crown facets, twelve crown half facets, a table facet, six main pavilion facets and a plurality of girdle facets separating the crown facets from the pavilion facets with each main crown facet having a symmetrically positioned opposite crown facet of substantially equal size surrounding the table facet and having at least one edge in parallel alignment with a corresponding edge in the main crown facet opposite thereto.

WO08136922A2: Hexagon shaped diamond which displays hearts and arrows pattern

Applicant: Sundiamond USA, United States of America
Publication: 2008-11-13
Filed: 2008-04-22
Status: application

A hexagonal 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 hexagon shaped diamond should be cut to form six main crown facets of substantially equal size symmetrically arranged relative to one another surrounding a table facet with each main crown facet having parallel edges symmetrically aligned to the parallel edges of a main crown facet located opposite thereto, six main pavilion facets polished in alignment with the main crown facets, girdle facets separating the pavilion facets from the main crown facets and twelve crown star facets.

WO08136921A2: Heart shaped diamond cut having hearts and arrows pattern

Applicant: Sundiamond USA, United States of America
Publication: 2008-11-13
Filed: 2008-04-22
Status: application

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

to the symmetrical central of the diamond and a multiple number of crown star facets spaced apart from one another on the surface of the diamond. The pavilion half facets are arranged in pairs polished on the main pavilion facet with a first pavilion half facet in each pair lying at a first angle of preferably 26.25° relative to a second pavilion half facet in the same pair and with the second pavilion half facet in each pair cut at a second angle of preferably 33.75° relative to the first pavilion half facet in an adjacent pair with which it shares a common boundary.

WO08136920A2: Oval shaped diamond cut having hearts and arrows pattern

Applicant: Sundiamond USA, United States of America
Publication: 2008-11-13
Filed: 2008-04-22
Status: application

An oval shaped diamond, adapted to display a hearts and arrows pattern when exposed to light characteristic of the hearts and arrows pattern in a round diamond, comprising: an oval shape having two long sides symmetrical to each other, two short sides symmetrical to each other and four corner sides symmetrically located between the long sides and the short sides respectively, eight main crown facets of unequal size and eight main pavilion facets of unequal size, sixteen pavilion half facets; a girdle of non-uniform thickness separating the crown and pavilion facets and two subsidiary pavilion facets in alignment with each other on the long sides of the diamond adjacent a main pavilion facet.

WO08136919A2: Triangular star shaped diamond having hearts and arrows pattern

Applicant: Sundiamond USA, United States of America
Publication: 2008-11-13
Filed: 2008-04-22
Status: application

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

US20080282733A1: Memory gemstones

Applicant: -
Publication: 2008-11-20
Filed: 2008-04-23
Status: application

Animal or human tissue is digested to extract carbon-containing gases. The digestion process can include hydrolysis, acidogenesis, acetogenesis, and methanogenesis. The step of denitrification can be added if too much nitrogen is produced during digestion. Digestion can also include enzymes that break down the tissue in preparation for methanogenesis. The carbon-containing gas can be added onto or be incorporated throughout a natural or synthetic diamond or other gemstone. The carbon-containing gas can be added during hydrothermal synthesis to create a gemstone with the carbon-containing gas incorporated throughout.

US7444835: Creating illusion of large gemstones

Applicant: -
Publication: 2008-11-04
Filed: 2006-03-30
Status: granted

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

WO08138841A1: Method to produce light-emitting nano-particles of diamond

Applicant: INSERM (Institut National de la Santé et de la Recherche Médicale), France
Publication: 2008-11-20
Filed: 2008-05-07
Status: application

Method to produce diamonds containing Nitrogen-Vacancy centres from diamonds grown by a high pressure and high temperature process and containing isolated substitutional nitrogen, comprising: - Irradiating said diamonds by an electron beam such that the irradiation dose is comprised between 10^{17} and 10^{19} electrons per square centimeter; - annealing the irradiated diamonds in vacuum or in an inert atmosphere at a temperature above 700°C and for at least 1 hour; characterized in that said electron beam has an acceleration energy above 7 MeV.

US7452420: Apparatus and method for diamond production

Applicant: Carnegie Institution of Washington; The UAB Research Foundation, USA
Publication: 2008-11-18
Filed: 2007-04-23
Status: granted

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

EP1990313A1: Method to produce light-emitting nano-particles of diamond

Applicant: INSERM (Institut National de la Santé et de la Recherche Médicale), France
Publication: 2008-11-12
Filed: 2007-05-10
Status: application

Method to produce diamonds containing Nitrogen-Vacancy centres from diamonds grown by a high pressure and high temperature process and containing isolated substitutional nitrogen, comprising:

- Irradiating said diamonds by an electron beam such that the irradiation dose is comprised between 10^{17} and 10^{19} electrons per square centimeter;
- annealing the irradiated diamonds in vacuum or in a inert atmosphere at a temperature above 700°C and for at least 1 hour; characterized in that said electron beam has an acceleration energy above 7 MeV.

EP1707654B1: Method for manufacturing diamond single crystal substrate, and diamond single crystal substrate

Applicant: Sumitomo Electric Industries, Japan
Publication: 2008-11-05
Filed: 2006-03-23
Status: granted

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

EP1990089A2: A method and equipment of producing graphite and metallic catalyst composite for diamond synthesis

Applicant: Jiangsu Tianyi Micro Metal Powder, China
Publication: 2008-11-12
Filed: 2007-12-19
Status: application

This invention releases the preparation method and equipment of graphite and catalyst composite for a kind of synthetic diamond. Firstly the clean graphite particle shall be placed into the heating chamber for pre-heating, the lower limit of the heating temperature shall be higher than the boiling point of the coated carbonyl metal complex and the upper limit of the heating temperature shall be set according to the thickness of the coating needed; secondly, the heated graphite particle will be fed into the coating room with vibrator or agitator and the steam of carbonyl metal complex shall be input for coating; finally the coated graphite particle shall be fed into the cooling and passivation room for cooling and passivation of the discharging materials or enter the next round circle of heating and coating. As to the graphite and catalyst composite prepared by this invention, the surface of each graphite particle is plated with metal layer and the continuous metallic contact is formed between the particles of the synthetic cylinder prepared by it. In synthesis, it is easy to form the continuous metallic film so as to continuously feed the carbon to the diamond crystal nucleus to promote the crystal nucleus growing into perfect diamond crystal.

US20080293328A1: O.D. Centerless Grinding Machine

Applicant: -
Publication: 2008-11-27
Filed: 2007-05-21
Status: application

In one aspect of the present invention, an outer diameter (O.D.) centerless grinding machine for use in grinding a diamond workpiece has a grinding wheel positioned parallel to a regulating wheel which is adapted to press a cylindrical workpiece into the grinding wheel as the regulating wheel rotates. Electronic equipment may be adapted to

adjust a pressure of the regulating wheel against the grinding wheel. Also, a carrier may be adapted to house the workpiece, the carrier being attached to a translation mechanism adapted to move the carrier between the wheels such that the workpiece is in contact with both wheels.

US7449065: Method for the growth of large low-defect single crystals

Applicant: Ohio Aerospace Institute, United States of America
Publication: 2008-11-11
Filed: 2006-12-02
Status: granted

A method and the benefits resulting from the product thereof are disclosed for the growth of large, low-defect single-crystals of tetrahedrally-bonded crystal materials. The process utilizes a uniquely designed crystal shape whereby the direction of rapid growth is parallel to a preferred crystal direction. By establishing several regions of growth, a large single crystal that is largely defect-free can be grown at high growth rates. This process is particularly suitable for producing products for wide-bandgap semiconductors, such as SiC, GaN, AlN, and diamond. Large low-defect single crystals of these semiconductors enable greatly enhanced performance and reliability for applications involving high power, high voltage, and/or high temperature operating conditions.

WO08142657A1: Coated diamond

Applicant: Element Six Limited, Ireland; DONALD Heather, South Africa
Publication: 2008-11-27
Filed: 2008-05-22
Status: application

The invention relates to a coated diamond comprising a diamond substrate; a primary carbided layer of a carbide forming element; a secondary layer of a high melting point metal selected from W, Mo, Cr, Ni, Ta, Au, Pt, Pd or any combination or alloy thereof, the secondary layer being substantially free of carbide forming element from the primary layer; and an overcoat of Ag, Ni, Cu, Au, Pd, Pt, Rh, Os, Ir, Re, any combination or alloy thereof, the metal of the secondary layer being different to the metal of the overcoat. The invention further relates to methods for producing such coated diamonds and abrasive-containing tools including such coated diamonds.

JP2008179498A2: Diamond substrate

Applicant: Sumitomo Electric
Publication: 2008-08-07
Filed: 2007-01-24
Status: application

Problem to be solved: To manufacture a large area diamond substrate for a short time at a low cost and prevent a single crystal diamond seed substrate from falling when polishing and the like.

Solution: In a diamond substrate prepared by bonding the single crystal diamond seed substrate to a silicon substrate through the intermediary of a diamond layer, the diamond substrate is characterized in that the sectional plane structure is such that the single crystal diamond seed substrate is disposed on the silicon substrate, one or whole part of an upper plane of the single crystal diamond seed substrate is inclined, the angle of inclination is greater than the angle between a bottom plane and a straight line obtained by connecting an intersecting point of a bottom plane with an inclined plane to an intersecting point of the upper plane with a facing side plane, and less than 90° .

JP2008105872A2: Diamond substrate

Applicant: Sumitomo Electric
Publication: 2008-05-08
Filed: 2006-10-24
Status: application

Problem to be solved: To provide a diamond substrate suitable for forming diamond film by a thick film vapor phase synthesis by controlling the surface shape of the diamond substrate by a machine polishing.

Solution: The diamond substrate is one that has a plurality of protruded parts formed on its surface wherein the protruded parts are formed on the principal surface of the diamond substrate. In the diamond substrate, it is preferred that the area in plan view of the pattern appeared on the top surface of the protruded parts occupies 10% or more against the area of the principal surface of the diamond substrate.

JP2008150246A2: Method for producing diamond

Applicant: Ehime Univ; Toyota Industries Corp
Publication: 2008-07-03
Filed: 2006-12-18
Status: application

Problem to be solved: To provide a method for producing a diamond efficiently and at a high speed using in-liquid plasma.

Solution: A liquid which contains carbon, hydrogen and oxygen, where the ratio of the number of hydrogen atoms to the total numbers of carbon atoms and hydrogen atoms is 0.75 or more and 0.82 or less and where the ratio of the number of carbon atoms to the total numbers of carbon atoms and oxygen atoms is 0.47 or more and 0.58 or less is irradiated with an electromagnetic wave. Plasma is generated in the liquid and then the diamond is produced.
