State of the art

Patent news archive 2009

DE102007028718A1: Schmuckstein
Applicant: Juwelier Stolze GmbH, DE
Publication: 2009-01-02
Filed: 2007-06-21
Status: application

Ein Schmuckstein zur Verwendung als Juwelund/oder Brillant weist eine Tafel auf, durch die eine Tafelebene definiert ist. Der Schmuckstein weist eine erste geschliffene Anlagefläche unter einer zweiten geschliffenen Anlagefläche auf, die unter einem Winkel α relativ zueinander angeordnet sind. Die erste Anlagefläche und die zweite Anlagefläche sind im Wesentlichen senkrecht zu der Tafelebene angeordnet. Dadurch ist es möglich, mehrere Schmucksteine zu einem größeren Juwel zusammenzusetzen, so dass die Schmucksteine mit geringen Herstellungskosten zu einem Juwel und/oder Brillant weiterverarbeitet werden können.

EP1895868B1: Precious, semi-precious or mineral cut stone and method for cutting same
Applicant: Sato, Takehiko, Belgium / Koganei, Misuzu, Japan
Publication: 2008-12-17
Filed: 2006-05-19
Status: granted

Precious, semi-precious or mineral cut stone, comprising a crown comprising at its centre a planar table surrounded by several crown facets, a pavilion comprising a pointed culet and several pavilion facets, and between the crown and the pavilion, a girdle, characterised in that the said pavilion facets comprise at least one point facet that extends between the said pointed culet and an intermediate location between the girdle and the culet

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CN21153610Y
Applicant: -
Publication: 2008-11-26
Filed: 2008-03-06
Status: Granted Utility Model

Cutting diamond, has flat crown part formed above waist, conical pavilion part formed below waist, and crown facet with star facets formed between periphery and crown kite facets.

AU3252866BB: Improved rectangular brilliant-cut diamond pattern

Applicant: Hohoemi Brains Inc
Publication: 2008-12-04
Filed: 2003-10-08
Status: granted

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

US20090004093A1: Materials and methods for the manufacture of large crystal diamonds

Applicant: -
Publication: 2009-01-01
Filed: 2008-08-29
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 ceramic material such as MgO, Al2O3, BaTiO3, and the like. A surface of the single crystal substrate is coated using an electron beam evaporation device with 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.

US20080311024A1: Diamond single crystal substrate manufacturing method and diamond single crystal substrate
Applicant: Sumitomo Electric Industries, Ltd., Japan
Publication: 2008-12-18
Filed: 2008-08-15
Status: application

A diamond single crystal substrate manufacturing method for growing by vapor-phase synthesis a single crystal from a diamond single crystal seed substrate, comprising etching away by reactive ion etching, prior to single crystal growth, at least 0.5 mum and less than 400 mum, in etching thickness off the surface of the seed substrate which has been mechanically polished, thereby removing from the surface of the seed substrate the work-affected layers caused by mechanical polishing; and growing then a single crystal thereon. The manufacturing method provides a diamond single crystal substrate having a high quality, large size, and no unintentional impurity inclusions, and suitable for use as semiconductor materials, electronic components, optical components or the like.

US20080311023A1: Single Crystal Diamond
Applicant: -
Publication: 2008-12-18
Filed: 2005-05-26
Status: application

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

US7459702: Apparatus and method for polishing gemstones and the like
Applicant: -
Publication: 2008-12-02
Filed: 2005-10-26
Status: granted

The invention comprises a two-step process for achieving an ultra-polish finish on materials such as gemstones and the like by first performing a chemical-mechanical

polishing of the material using an intermetallic material as the grinding medium followed by a gas cluster ion beam (GCIB) treatment. The intermetallic grinding wheel is formed of carbide-forming metals in the form of intermetallics consisting of one kind or more of elements selected from the group of Al, Cr, Mn, Fe, Co, Ni, Cu, Ru, Rh, Pd, Os, Ir and Pt, and one kind or more of elements selected from the group of Ti, V, Zr, Nb, Mo, Hf, Ta and W. The gas cluster ion beams are comprised of gas clusters having nano-sized aggregates of materials that are gaseous under conditions of standard temperature and pressure. Such clusters can be ionized by electron bombardment or other means, permitting the gas clusters to be formed into directed beams of known and controllable energy. The larger sized gas clusters are the most useful because the larger sized gas clusters are able to carry substantial energy per cluster ion, while yet having only modest energy per atom or molecule.

US7459024: Method of forming an N-type doped single crystal diamond
Applicant: Apollo Diamond, Inc., United States of America
Publication: 2008-12-02
Filed: 2004-10-29
Status: granted

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

EP1370709B1: Method and apparatus for synthesizing diamond by chemical vapor deposition
Applicant: Precision Diamond Co., Ltd., Republic of Korea
Publication: 2008-12-10
Filed: 2002-02-26
Status: granted

A method for synthesizing diamond based on hydrogen and methane gas by chemical vapor deposition, the method using hot metal filaments as a heat source, the method using apparatus comprising a pair of conductive electrodes, each electrode having a flat surface on a top portion thereof and a curved surface on an outer side thereof, and a plurality of metal filaments placed over both electrodes to extend between the electrodesand such that each filament is in contact with both the flat surface and the curved surface of each electrode, wherein each end of each filament is weighted with individual weights in order to tension the filaments placed over the electrodes, the apparatus also comprising conductive cover plates mounting a region of each filament to the flat surface, the method

comprising supplying electrical power to the filaments to heat them and to synthesize diamond, wherein the region of each filament enclosed by the conductive cover plate and the flat surface does not generate heat.

EP1657544B1: Method for discerning colourless and almost colourless diamonds and arrangement for carrying out this method

Applicant: Wetenschappelijk en Technisch Onderzoekscentrum voor Diamant, BE
Publication: 2008-12-03
Filed: 2005-03-01
Status: granted

The invention concerns a method for qualifying a diamond on the basis of a measured light transmission through the diamond, whereby the diamond is radiated by a light source (5) which emits light having a wavelength in a range of 225 nm to 300 nm, whereby the transmission of said light through the diamond is compared to a reference value which corresponds to the transmission of said light through a reference diamond, which is a cut colourless or near colourless diamond with a concentration of A centres between 7 ppm and 22 ppm, and whereby the diamond is classified as natural and not colour-treated if the transmission through the diamond is smaller than or equal to the reference value.

US7461017: System and method for enabling jewelry certification at local jeweler sites

Applicant: -
Publication: 2008-12-02
Filed: 2004-04-30
Status: granted

A system and method of providing informational certificates concerning characteristics of jewelry items to customers are disclosed. The system comprising, a terminal having a user interface configured to receive user input information concerning at least a first characteristic of a first jewelry item, a camera device capable of obtaining image information regarding at least a part of the first jewelry item, and a printing device at least temporarily coupled to the terminal and the camera device and capable of printing a first certificate, where the first certificate includes a first portion of information based upon the user input information and a second portion of information based upon the image information, and where the terminal, the camera device and the printing device are proximate a local point of sale of the first jewelry item.

US7468786: Engraved gemstone viewer

Applicant: GemEx Systems, Inc., United States of America
Publication: 2008-12-23
Filed: 2006-11-13

Status: granted

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

JP04142547B2
Applicant: -
Publication: 2008-09-03
Filed: 2003-10-09
Status: granted

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

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JP2008222468A2: Fine processing method of diamond surface
Applicant: National Institute of Advanced Industrial & Technology
Publication: 2008-09-25
Filed: 2007-03-09
Status: application

Problem to be solved: To provide a method for controlling the surface roughness of a sidewall of a diamond structure manufactured by dryetching.
Solution: In a method for dryetching a diamond specimen held on a specimen holder, the surface roughness of a sidewall of the diamond specimen is controlled by forming a third layer between the diamond specimen and the specimen holde. Besides, the surface temperature of the diamond specimen in an etching gas atmosphere is controlled in the range of -150 to 800°C.

US20090022951A1: Single crystal diamond elements having convex surfaces and methods of its fabrication
Applicant: Element Six Limited United Kingdom
Publication: 2009-01-22
Filed: 2006-07-07
Status: application

A single crystal diamond element having a convex surface is disclosed, the convex surface including a spherical segment for which the maximum peak to valley deviation from a perfect spherical surface is less than about 5 μm. Alternatively or in addition, the RMS deviation from a perfect spherical surface may be less than about 500 nm, or the RMS roughness less than about 30 nm. A single crystal diamond element with a radius of curvature less than about 20 mm is also disclosed. In one aspect a single crystal diamond element having a conical half-angle greater than about 10° is described. The invention also provides a method for forming a rotationally symmetrical surface on a single crystal diamond element, comprising rotating the element about a first axis, applying a laser beam to the element in a direction perpendicular to the first axis, and translating the laser beam in two dimensions in a plane perpendicular to the direction of the beam. If the two-dimensional path follows the arc of a circle a spherical surface may be formed. The invention also provides improving a spherical surface on a single crystal diamond element by pressing a rapidly rotating cup onto a slowly rotating element. The element may be a lens, in particular a solid immersion lens.

US7481879: Diamond single crystal substrate manufacturing method and diamond single crystal substrate

Applicant: Sumitomo Electric Industries, Ltd., Japan
Publication: 2009-01-27
Filed: 2005-01-11
Status: granted

A diamond single crystal substrate manufacturing method for growing by vapor-phase synthesis a single crystal from a diamond single crystal seed substrate, comprising etching away by reactive ion etching, prior to single crystal growth, at least 0.5 μm and less than 400 μm, in etching thickness off the surface of the seed substrate which has been mechanically polished, thereby removing from the surface of the seed substrate the work-affected layers caused by mechanical polishing; and growing then a single crystal thereon. The manufacturing method provides a diamond single crystal substrate having a high quality, large size, and no unintentional impurity inclusions, and suitable for use as semiconductor materials, electronic components, optical components or the like.

US20080318023A1: Diamond shell fabricated by using porous particle and the fabrication method thereof

Applicant: -
Publication: 2008-12-25
Filed: 2006-04-13
Status: application

A hollow diamond shell with a size of a few micrometer to hundreds of micrometer and having a geometrical shape and its fabrication method are disclosed. A diamond film is deposited by a CVD method and porous grits are used as a victim substrate to be etched later, so that the substrate can be easily removed by a capillary phenomenon that an etching solution can be intensively absorbed in a substrate etching process. Thus, a

perfect diamond shell with only a plurality of fine pores with a nano size without any conspicuous opening can be obtained. Also, a diamond shell with a small opening of below 10 percent of the surface area of grits can be fabricated by controlling a nuclear generation of diamond particles.

US20090014314A1: Synthesis of diamond by extraction of a pulse derived from the abrupt collapse of a magnetic field

Applicant: -
Publication: 2009-01-15
Filed: 2006-06-20
Status: application

A process for converting carbonaceous material into diamond utilizing the compressive force derived from an abruptly collapsing magnetic field.

EP1143044A4: Coated diamond, method for preparing the same and composite material comprising the same

Applicant: Sumitomo Electric Industries, Japan / Miyamoto Yoshinari, Japan
Publication: 2009-01-21
Filed: 2000-09-21
Status: application

From equivalent EP1143044A1. A coated diamond which is dense and excellent in adherence and enables diamond to exhibit its superior characteristics, a manufacturing method and a composite material of the coated diamond are achieved. The coated diamond includes a diamond and an SiC film coating the diamond. The SiC mentioned above is substantially formed of beta -SiC and a value of ratio I (220) / I (111) is at least 0.38 and at most 0.55, I (220) representing peak intensity of Miller index (220) of SiC and I (111) representing peak intensity of Miller index (111) thereof.

JP2008180568A2: Diamond indentor

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

Problem to be solved: To provide a tough diamond indentor of high strength which prevents cleave cracking or chipping like a conventional single crystal diamond and plastic deformation at a high temperature.
Solution: The diamond indentor having high hardness is formed of polycrystalline diamond only substantially comprising diamond obtained by sintering a raw material composition containing a non-diamond type carbon substance under an ultrahigh pressure and high temperature condition without adding a sintering aid and a catalyst to directly

converting it to diamond. The polycrystalline diamond has a mixed texture of a fine particulate diamond crystal with the maximum particle size of 100 nm or below and an average particle size of 50 nm or below and a plate-shaped or granular coarse particulate diamond crystal with a particle size of 50-10,000 nm.

JP2008207223A2: Smoothing method of diamond film

Applicant: Nachi Fujikoshi Corp / Suzuki Kiyoshi / Yasunaga Nobuo
Publication: 2008-09-11
Filed: 2007-02-27
Status: application

Problem to be solved: To provide a technology capable of more stably smoothing a diamond film synthesized on the surface of a substrate by a CVD process by using laser beams than heretofore.
Solution: Laser beams are emitted at the angle of ≥80° and <90° with respect to the normal of the surface of a diamond film in the vicinity of a machining point, and the surface of the diamond film is stably smoothed by using the reflective effect of the laser beams. The fifth harmonic wave of YAG laser beams is used for the laser beams. In addition, the laser beams are applied in a decompression state. After the beam diameter of the laser beams is expanded by a beam expander, a portion of the laser beams of the uniform intensity is cut out by an aperture and the laser beams having the excellent uniformity is condensed on the surface of the diamond film. In addition, completion of the machining is determined by detecting the laser beams reflected on the diamond film.

USD584992: Highly faceted princess cut stone

Applicant: Rosy Blue, N.V. Belgium
Publication: 2009-01-20
Filed: 2007-06-29
Status: granted

The ornamental design for a highly faceted princess cut stone, as shown.

EP1694155B1: Faceted gemstone

Applicant: Abittan Abrasives / Colour Me / Drop-a-Diamond / Pearl of Diamond / Faceted Rocks 100% Diamond, Belgium
Publication: 2009-02-11
Filed: 2003-12-02
Status: granted

A gemstone having a surface at least part of which is polished, wherein that at least a visible part of the stone is polished, characterised in that the polished surface comprises a plurality of adjacent facets each having a surface area of between 0.04 and 0.25 mm2, the angle between the adjacent facets is between 0.1 and 5°, and the facets are applied along the surface of the stone in such a way that they follow the original contours of the stone.

US7487870: Device and kit for visualizing a cutting regime of a diamond, and a method for determining a cutting regime
Applicant: Diamscan NV, Belgium
Publication: 2009-02-10
Filed: 2003-11-05
Status: granted

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

DE60319445T2: Vorrichtung und satz zur visualisierung eines schleifplans für einen diamant und verfahren zur bestimmung eines schleifplans
Applicant: Diamscan NV, Belgium
Publication: 2009-02-19
Filed: 2003-11-05
Status: Translation of the European Patent

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

DE602006004341C0: Geschliffener edel-, halbedel- oder mineralstein und schleifart
Applicant: Koganei Misuzu Japan / Sato Takehiko Belgium

Publication: 2009-01-29
Filed: 2006-05-19
Status: granted

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

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AT0010381U1: Längliches dekoratives Element
Applicant: Swarovski & Co Austria
Publication: 2009-02-15
Filed: 2008-06-19
Status: Utility Model with search report

US20090038341A1: Round brilliant cut diamond and its incision method
Applicant: -
Publication: 2009-02-12
Filed: 2004-09-09
Status: application

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

US20090050897A1: Substrate, method of polishing the same, and polishing apparatus
Applicant: -
Publication: 2009-02-26
Filed: 2006-07-07
Status: application

A polishing method and a polishing apparatus capable of polishing a surface of a substrate made of SiC or diamond extremely smoothly and efficiently without causing subsurface damage are provided. A polishing platen can rotate around a rotating shaft, and is made of quartz having high transparency to ultraviolet radiation. A large number of grooves are arranged on a front surface of the polishing platen in a lattice form, and each of the grooves is filled with solid photocatalytic particles (CeO2). The polishing platen is relatively rubbed against a to-be-polished surface of a substrate made of silicon carbide (SiC) or diamond (C) while pressing the polishing platen to the to-be-polished

surface of the substrate with a very high pressure, thereby the to-be-polished surface is oxidized by the solid photocatalytic particles to perform chemical polishing. The oxidation of the to-be-polished surface is promoted by applying ultraviolet radiation from an ultraviolet source lamp, and polishing is promoted by heating by an infrared source lamp.

US20090050824A1: Method of fabricating a structure from diamond material or diamond-like carbon material

Applicant: The University of Melbourne, Australia
Publication: 2009-02-26
Filed: 2008-06-24
Status: application

A method of fabricating a structure from diamond material or diamond-like carbon material, and a structure according to the method, the method comprising the steps of imposing a structural transformation on the crystallographic structure of the material in a first region located at a first depth below a surface of the material; imposing a structural transformation on the crystallographic structure of the material in a second region located at a second depth below the surface of the material and above of the first region, the second depth being selected so that the first region is separated from the second region by a third region; and removing at least a portion of the material of the first and second regions; wherein the structural transformations are imposed so that the crystallographic structure of the third region is largely unaffected and the third region has opposite surface portions from which material of the first and second regions has been removed.

US20090038934A1: Apparatus and method for diamond production

Applicant: -
Publication: 2009-02-12
Filed: 2008-10-17
Status: application

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

the growth surface, wherein a growth rate of the diamond is greater than 1 micrometer per hour.

EP2023381A1: Method of selectively forming atomically flat plane on diamond surface, diamond substrate produced by the method, and semiconductor element employing the same

Applicant: National Institute of Advanced Industrial Science and Technology, Japan
Publication: 2009-02-11
Filed: 2007-04-23
Status: application

The present invention provides a method of selectively forming a flat plane on an atomic level on a diamond (001), (110) or (111) surface. A method of selectively forming a flat plane on a diamond surface comprising growing diamond on a stepped diamond surface of any of crystal structures (001), (110) and (111) by CVD (Chemical Vapor Deposition) under growth conditions such that step-flow growth of diamond is carried out thereafter.

US20090051897A1: Method and Apparatus for Identifying and Characterizing Objects based on Fluorescence

Applicant: -
Publication: 2009-02-26
Filed: 2007-08-24
Status: application

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

US20090039061A1: Fine processing method for a material of sintered diamond with a laser beam, a cutter wheel for a substrate made of a brittle material and its producing method thereof

Applicant: Mitsuboshi Diamond Industrial, Ltd., Japan
Publication: 2009-02-12
Filed: 2006-02-02
Status: application

The present invention provides a manufacturing method for accurate, fine and efficient processing of a work piece to be processed and prevention of graphitization of the work piece to be processed, when sintered diamond is processed by a laser beam. The method provides process comprising steps of irradiating outer circumference of a scribing wheel with a laser beam from the side of the wheel, moving the laser beam relative to the wheel, forming continuously along the circumferential direction in the required space fine grooves with openings directed radially on a ridge site, irradiating the laser beam onto the site to be processed at a speed of the laser beam relative to the work piece, and forming the work piece into a minute shape within a depth of less than 200 mum.

JP04142547B2
Applicant: -
Publication: 2008-09-03
Filed: 2003-10-09
Status: granted

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

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JP2008222468A2: Fine processing method of diamond surface
Applicant: National Institute of Advanced Industrial & Technology
Publication: 2008-09-25
Filed: 2007-03-09
Status: application

Problem to be solved: To provide a method for controlling the surface roughness of a sidewall of a diamond structure manufactured by dry etching.
Solution: In a method for dry etching a diamond specimen held on a specimen holder, the surface roughness of a sidewall of the diamond specimen is controlled by forming a third layer between the diamond specimen and the specimen holder. Besides, the surface temperature of the diamond specimen in an etching gas atmosphere is controlled in the range of -150 to 800°C.

ES2301379BB: 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: 2009-03-16
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, sometiéndose 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.

WO2009029137A1: Gemstone facet configuration
Applicant: Charles & Colvard, United States of America
Publication: 2009-03-05
Filed: 2008-06-19
Status: granted

A gemstone can include a crown portion having a table facet, a plurality of trapezoidal facets, a plurality of irregular-hexagonal facets, a plurality of irregular- pentagonal facets, and a plurality of triangular crown- facets. The gemstone can also include a pavilion portion having a plurality of first kite facets, a plurality of irregular-quadrilateral facets, a plurality of second kite facets, and a plurality of triangular pavilion- facets.

US20090056374A1: Gemstone Facet Configuration
Applicant: -
Publication: 2009-03-05
Filed: 2007-08-31
Status: Application

A gemstone can include a crown portion having a table facet, a plurality of trapezoidal facets, a plurality of irregular-hexagonal facets, a plurality of irregular-pentagonal facets, and a plurality of triangular crown-facets. The gemstone can also include a pavilion portion having a plurality of first kite facets, a plurality of irregular-quadrilateral facets, a plurality of second kite facets, and a plurality of triangular pavilion-facets.

US20090070236A1: Diamond and Precious Stone Trading Platform with Funding and Delivery Transparency
Applicant: -
Publication: 2009-03-12
Filed: 2008-11-13
Status: application

The transparent diamond and precious stone trading platform and method has funding and delivery transparency during the buy-order, funding, and tracking pickup,

independent comparative inspection, and final delivery of each stone. The database of stones includes, for each stone, stone-weight, stone characteristics, price, and a grading lab certificate. The certificate uniquely identifies each stone and is electronically accessible by sellers, buyers, couriers, and authentication services. A buy command is communicated to seller and buyer. The transfer funds is electronically noted and communicated. The pickup by courier, interim delivery, inspection comparing the stone to the certificate, and subsequent delivery to buyer and release of funds is communicated to traders by emails, text messages, automated voice messages or IVR. Buyer and seller profiles establish communications channels and organizational managers are also permitted access and given communications. If time or place parameters are exceeded, increasing levels of alarm electronic communications are implemented.

EP1378591B1: Method for removing defects in crystals
Applicant: Diamond Innovations, United States of America
Publication: 2009-03-25
Filed: 2003-06-25
Status: granted

A method for removing defects at high pressure and high temperature (HP/HT) or for relieving strain in a non-diamond crystal commences by providing a crystal, which contains defects, and a pressure medium. The crystal and the pressure medium are disposed in a high pressure cell and placed in a high pressure apparatus, for processing under reaction conditions of sufficiently high pressure and high temperature for a time adequate for one or more of removing defects or relieving strain in the single crystal.

JP2008279194A2: ACCESSORY STRUCTURE
Applicant: Arts Design
Publication: 2008-11-20
Filed: 2007-05-14
Status: application

Problem to be solved: To provide a new accessory structure as a technique of using a new transparent stone to give added value as an accessory.
Solution: In this accessory structure, an object or a design as a subject is provided on the lower side or the bottom of the transparent stone subjected to facet cutting, and in a top view or a top perspective view of the transparent stone the visibility of target article or design is varied and reflected on facets.

JP2008221352A2: POLISHING METHOD AND POLISHING DEVICE
Applicant: Kumamoto Technology & Industry Foundation
Publication: 2008-09-25
Filed: 2007-03-09
Status: application

Problem to be solved: To provide a polishing method and a polishing device capable of extremely smoothly polishing without leaving a sub surface damage on surfaces to be polished to form the surfaces to be polished free from chipping, and accurately polishing even a curved surface.
Solution: An object to be polished (diamond cutting tool) is held by a cutting tool holding mechanism having adjustable angle and swing. The flank and the face of the diamond cutting tool are polished by a plate-like polishing surface plate having a deformable polishing surface. The polishing surface plate is formed of a circular quartz plate having a thickness of 1 mm or shorter and a diameter of 20-40 mm. The surfaces to be polished (the flank and the face) are radiated with an ultraviolet L from an ultraviolet light source lamp. The rotational speed, position, and swing angle of the polishing surface plate are adjusted by an automatic spindle swing mechanism.

US7526928: Multi-color gemstones and gemstone coating deposition technology
Applicant: Azotic Coating Technology, United States of America
Publication: 2009-05-05
Filed: 2005-12-17
Status: granted

The invention provides a gemstone or a decorative object having at least one surface bearing a thin film coating. In some embodiments, there is provided a gemstone having an appearance characterized by at least two different color zones, where such two zones are of different colors. In other embodiments, two different areas of a single (e.g., integral, one-piece) gemstone carry coatings of different composition, and the resulting appearance of the gemstone is characterized by the stone exhibiting substantially a single uniform body color that is different than the body color the stone would exhibit if it were coated only with one or the other of the coatings. Also provided are new deposition techniques.

EP2042052A1: Gemstone
Applicant: RC Tritec, Switzerland
Publication: 2009-04-01
Filed: 2007-09-25
Status: application

Beschrieben werden ein Schmuckstein aus einem nachleuchtenden Kristall oder einem nachleuchtenden Einkristall, seine Verwendung und ein Verfahren zu dessen Herstellung.

FR2912240B1: Procede de rendu d'images en temps reel de modeles en trois dimensions de pieces de joaillerie
Applicant: Vision Numeric, France
Publication: 2009-04-17

Filed: 2007-02-01
Status: granted

[From equivalent FR2912240A1] Procédé de rendu d'images en temps réel de modèles en trois dimensions de pièces de joaillerie comprenant au moins une pierre 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.

DE60326180C0: Edelstein mit facetten
Applicant: Abittan Abrasives & Colour Me, Belgium
Publication: 2009-03-26
Filed: 2003-12-02
Status: granted

A gemstone having a surface at least part of which is polished, wherein that at least a visible part of the stone is polished, characterised in that the polished surface comprises a plurality of adjacent facets each having a surface area of between 0.04 and 0.25 mm2, the angle between the adjacent facets is between 0.1 and 5°, and the facets are applied along the surface of the stone in such a way that they follow the original contours of the stone.

AT0010470U1: Verfahren zur herstellung eines schmucksteines, schmuckstein sowie schmuckstück
Applicant: Grabner Martin, Austria
Publication: 2009-04-15
Filed: 2008-06-24
Status: Utility Model with search report

WO2009045445A1: Low pressure method annealing diamonds
Applicant: Carnegie Institution of Washington, United States of America
Publication: 2009-04-09
Filed: 2008-10-02
Status: application

The present invention relates to method of improving the optical properties of diamond at low pressures and more specifically to a method of producing a CVD diamond of a desired optical quality which includes growing CVD diamond and raising the

temperature of the CVD diamond from about 1400 °C to about 2200 °C at a pressure of from about 1 to about 760 torr outside the diamond stability field in a reducing atmosphere for a time period of from about 5 seconds to about 3 hours.

US20090110626A1: Low Pressure Method of Annealing Diamonds
Applicant: -
Publication: 2009-04-30
Filed: 2008-10-02
Status: application

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

US7524372: Method for manufacturing diamond single crystal substrate
Applicant: Sumitomo Electric Industries, Japan
Publication: 2009-04-28
Filed: 2006-03-27
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.

US7515251: Fluorescence measuring device for gemstones
Applicant: Gemological Institute of America, United States of America
Publication: 2009-04-07
Filed: 2007-08-24
Status: granted

A gemstone fluorescence measuring device according to the invention generally includes an ultraviolet ("UV") emission chamber, a UV radiation source, and a light meter assembly. The UV radiation source includes an upper light emitting diode ("LED") and a lower LED that radiate a gemstone under test from both above and below the gemstone.

The UV radiation source provides both trans-radiation and direct radiation to the gemstone, and the UV radiation source has an adjustable intensity, thus facilitating calibration of the fluorescence measuring device. The light meter assembly includes a light detector that detects the visible light emitted from the gemstone under test in response to the UV radiation. The light detector is configured to simulate the spectral characteristics of the human eye. The fluorescence measuring device converts the measured visible light into a numerical lux reading, which can then be converted into a fluorescence grade for the gemstone under test.

US7514680: Apparatus for modifying and measuring diamond and other workpiece surfaces with nanoscale precision

Applicant: Metadigm, United States of America
Publication: 2009-04-07
Filed: 2007-02-23
Status: granted

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

JP2009013003A2: Method and apparatus for producing diamond

Applicant: Sumitomo Electric Ind
Publication: 2009-01-22
Filed: 2007-07-04
Status: application

Problem to be solved: To prevent defects caused by separation etc. of a diamond film or abnormal growth, etc. on a heat-radiating holder in a step of producing a diamond. Solution: The method for producing the diamond comprises the steps of: preparing a holder having a surface on which vapor deposition of the diamond is prevented or a holder which, even when the vapor deposition of the diamond occurs, prevents the separation of the deposited diamond at a holder temperature ranging from 1,300°C to room temperature and prevents abnormal growth of the diamond and/or a carbide; placing a substrate on which the diamond film is formed on the holder; and forming the diamond film on the substrate. An apparatus for producing the diamond is also provided. Preferably, the surface roughness Ra of the holder near the substrate is ≤0.01 μm.

US20090126402A1: Gemstones and methods for controlling the appearance thereof

Applicant: -
Publication: 2009-05-21
Filed: 2008-11-28
Status: application

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

US20090127506A1: High crystalline quality synthetic diamond

Applicant: -
Publication: 2009-05-21
Filed: 2006-12-08
Status: application

The invention relates to a single crystal CVD diamond material, wherein the extended defect density as characterised by X-ray topography is less than 400/cm2 over an area of greater than 0.014 cm2. The invention further relates to a method for producing a CVD single crystal diamond material according to any preceding claim comprising the step of selecting a substrate on which to grow the CVD single crystal diamond, wherein the substrate has at least one of a density of extended defects as characterised by X-ray topography of less than 400/cm2 over an area greater than 0.014 cm2; an optical isotropy of less than 1×10-5 over a volume greater than 0.1 mm3; and a FWHM X-ray rocking curve width for the reflection of less than 20 arc seconds.

US20090125435A1: Trading platform system and method for diamond and precious stone transactions

Applicant: -
Publication: 2009-05-14
Filed: 2008-11-13
Status: application

The transaction method and system facilitates sales of diamonds or stones. A searchable database of stones includes, for each stone, an offer to sell, a weight-carat, other stone characteristics and an electronic copy of a grading lab certificate which uniquely identifies each stone from all other stones in the database. A search displays, for each stone, the offer and stone weight, stone characteristics and electronic access to the stone's certificate. The system permits a prospective buyer to "buy now," which closes the transaction at the posted offer, or "bid now" wherein the system logs a bid value and an expiry time. Other bids are posted and displayed, in a primacy order until (a) the seller "buy now at the bid" or (b) withdraws the offer or (c) replaces the offer with a subsequent offer. Preferably, offers: displayed in time sequence and bids: displayed by primacy of price and expiry.

US20090123663A1: High velocity method for depositing diamond films from a gaseous phase in SHF discharge plasma and a plasma reactor for carrying out said method

Applicant: Institute of Applied Physics RAS, Russian Federation
Publication: 2009-05-14
Filed: 2008-07-23
Status: application

The invention relates to carbon deposition by decomposing gaseous compounds with the aid of the SHF discharge plasma and can be used, for example, for producing polycrystalline diamond films (plates), which are used for producing output windows of power SHF sources, for example gyrotrons. Said invention ensures a high speed deposition of the high quality diamond films (having a loss-tangent angle ¡ equal to or less than 3x10-5 on supports whose diameter is equal to or higher than 100 mm. For this purpose, a SHF discharge is initiated in a gas mixture which is arranged in a reaction chamber and contains at least hydrogen and hydrocarbon. Afterwards, said gas mixture is activated by producing a stable nonequilibrium plasma with the aid of SHF radiation having a frequency f which is many times higher than a commonly used frequency of 2.45 GHz, for example 30 GHz. In order to localize the plasma, a standing wave is formed near the carrier and plasma layers are formed in the antinodes thereof in such a way that the sizes thereof are adjustable.

JP2009035442A2: Method for processing diamond

Applicant: Kurita Water Ind
Publication: 2009-02-19
Filed: 2007-08-01
Status: application

Problem to be solved: To provide a method for processing diamond highly precisely at a low cost.
Solution: An electroconductive diamond to be processed is used as an anode, and the electroconductive diamond is electrochemically processed by applying a current between the anode and a cathode through a concentrated sulfuric acid solution of a conductivity of 11.5 Sm-1 or lower to generate a potential difference between the anode and the cathode to effect an electrolytic reaction. Desirably, the sulfuric acid solution has a sulfuric acid concentration of 80-96 mass%, and it is preferable that the application of the current is performed at an electrolysis temperature of 5-40°C and a current density of 60-1,000 A/dm2. The electroconductive diamond can be processed into any desired shape by partially masking its surface with a masking material during the current application.

JP2009023855A2: Method for reforming surface of diamond and cover material used for the same

Applicant: National Institute For Materials Science
Publication: 2009-02-05

Filed: 2007-07-18
Status: application

Problem to be solved: To provide a method for reforming an arbitrary area of the surface of a diamond at room temperature in a short processing time of about 1/10 of the conventional processing time without causing the generation of crystal cracks.
Solution: The reforming method comprises irradiating the surface of a diamond, arranged in an oxygen element-containing atmosphere or in vacuum or in an inert element-containing atmosphere, with a high energy light beam to oxidize the surface of the diamond. Ozone or active oxygen is used for constituting the oxygen element-containing atmosphere, and nitrogen, helium, neon, argon, krypton or xenon is used for constituting the inert element-containing atmosphere.

JP2009002703A2: Diamond inspection device
Applicant: Shimadzu Corp
Publication: 2009-01-08
Filed: 2007-06-19
Status: application

Problem to be solved: To provide a diamond inspection device capable of inspecting directly a diamond in a worked state into a ring or a necklace, without removing it from a pedestal or the like.
Solution: A sample holder holds the pedestal of a sample to make a specified surface a of the sample perpendicular to an incident light or come to the vicinity thereof, and is mounted on a stage. An infrared ray generated by an FTIR provided with an interferometer gets incident into the sample, and total-reflected in an inside of the sample to be emitted from the specified surface a of the sample. The emitted infrared ray is detected by a semiconductor detector, and a data is processed to obtain an infrared spectrum.

WO2009073576A2: Gemstones and methods for controlling the appearance thereof
Applicant: -
Publication: 2009-06-11
Filed: 2008-11-28
Status: application

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

DE202009003629U1: Facettiert geschliffener Edelstein, insbesondere Diamant

Applicant: Bürger, Helmut, München, Germany
Publication: 2009-07-02
Filed: 2009-03-14
Status: utility model

Facettiert geschliffener Edelstein, insbesondere Diamant, aufweisend mindestens eine Tafel, vier erste Unterteilfacetten, acht zweite Unterteilfacetten und acht dritte Unterteilfacetten, wobei die ersten Unterteilfacetten mit der Tafel jeweils erste Unterteilfacettenwinkel im Bereich von 45 bis 60° bilden, wobei die zweiten Unterteilfacetten mit der Tafel jeweils zweite Unterteilfacettenwinkel zwischen 45 bis 60° bilden, wobei die dritten Unterteilfacetten mit der Tafel dritte Unterteilfacettenwinkel im Bereich von 40 bis 55° bilden, wobei die acht zweiten Unterteilfacetten und die acht dritten Unterteilfacetten gegenüber den vier ersten Unterteilfacetten um eine gedachte Drehachse senkrecht zur Tafel gedreht sind, wobei erste Drehwinkel zwischen einer ersten und einer zweiten Unterteilfacette im Bereich von 2 bis 25°, sowie zweite Drehwinkel zwischen einer ersten und einer dritten Unterteilfacette im Bereich von 10 bis 38° ausgebildet sind.

WO2009078884A1: Gemstone and method for cutting the same
Applicant: -
Publication: 2009-06-25
Filed: 2008-01-22
Status: application

A gemstone is provided that has an improved brilliance, especially at the crown portion of the gemstone. The gemstone has a crown angle that is less than an ideal cut round diamond and, preferably the crown angle is less than 27 degrees. By reducing the crown angle of the gemstone, light entering one end of the crown portion may exit the opposite end of the gemstone. In addition, reducing the crown angle reduces the mass necessary for the gemstone. As a result, the gemstone has a width or diameter that corresponds to a larger mass gemstone that is cut according to conventional ideal proportions.

WO2009068354A1: Method and system for improved optical modeling of gemstones
Applicant: Ideal-Scope, Australia
Publication: 2009-06-04
Filed: 2008-10-06
Status: application

A method of constructing a virtual model of a gemstone including the steps of performing measurements of the gemstone to construct a three-dimensional (3D) model of an exterior surface of the gemstone; identifying one or more visible inclusions within an interior volume of the gemstone; for each identified inclusion, performing the steps of determining a location and 3D shape of the inclusion within the interior volume of the gemstone; capturing at least one image of the inclusion; using the at least one image to

determine relevant optical characteristics of the inclusion; and constructing a 3D virtual model of the inclusion, said model including the 3D shape of the inclusion and optical properties of the inclusion based upon said optical characteristics; constructing a 3D virtual model of the gemstone which includes the 3D virtual model of the exterior surface of the gemstone and the 3D virtual models of the one or more visible inclusions within the interior volume of the gemstone; and generating a dataset representing said 3D virtual model, wherein said dataset may be used in subseguent computer analysis to provide a user with information relating to a visual characteristic of the gemstone.

US20090169871A1: Method for producing high-quality surfaces and a product having a high-quality surface

Applicant: -
Publication: 2009-07-02
Filed: 2007-02-23
Status: application

The invention relates to a laser ablation method for coating an object with one or more surfaces, so that the object to be coated, i.e. the substrate, is coated by ablating the target, so that the uniformity of the surface deposited on the object to be coated is ±100 nm. The surface of the coated object is advantageously free of micron size particles, and it is typically a nano technological surface where the size of separate particles is ±25 nm at most. The object also relates to products made by said method.

US20090166343A1: Method for producing surfaces and materials by laser ablation

Applicant: Picodeon, Helsinki, Finland
Publication: 2009-07-02
Filed: 2007-02-23
Status: application

The invention relates to a laser ablation coating method, where the laser ablation is carried out in a space with 10−3 atmospheres at most. A low vacuum level enables an advantageous industrial production of surfaces without remarkably weakening the quality features of the deposited surfaces. The invention also relates to a method for producing nano particles, so that target material is ablated by pulse laser for generating nano particles in a space with 10−3 atmospheres at most.

US20090153835A1: Systems and methods for the evaluation of scintillation in gemstones

Applicant: -
Publication: 2009-06-18
Filed: 2008-12-09
Status: application

Systems and methods, for the evaluation, grading, and presentation of evaluation results, of the scintillation of gemstones, such as diamonds. Specifically, there are discussed systems and methods for determining when a scintillation event in a gemstone is likely to occur and for mapping such events to a presentation.

US20090147241A1: Method for evaluation of a gemstone
Applicant: Galatea, Israel
Publication: 2009-06-11
Filed: 2006-08-21
Status: application

A method of determining the position of inclusions in a gemstone, comprising: (a) placing the gemstone within a material having a refractive index within 0.5, optionally 0.2 or 0. 1, of that of the gemstone; (b) illuminating the gemstone and imaging the illuminated gemstone; and (c) determining the position of inclusions based on images of the inclusions in the images.

US7540075: Method of applying high pressures to a high pressure assembly
Applicant: -
Publication: 2009-06-02
Filed: 2005-08-24
Status: granted

An improved high pressure apparatus can include a plurality of complementary die segments. The die segments can have inner surfaces which are shaped to form a die chamber upon assembly of the die segments. A pair of anvils can be oriented such that an anvil is at each end of the die chamber. To prevent the die segments from being forced apart during movement of the anvils, force members can be connected to the die segments. The force members can apply discrete forces to the die segments sufficient to retain the die segments in substantially fixed positions relative to each other during application of force by the pair of anvils. Using such a high pressure apparatus can achieve pressures as high as 10 GPa with improved useful die life and larger reaction volumes.

US7557917: System and method for analysis of gemstones
Applicant: Collectors Universe, United States of America
Publication: 2009-07-07
Filed: 2005-05-06
Status: granted

A system for analyzing the chemical composition of a sample, comprising exciting a portion of the sample to generate atomic spectral emissions; a spectrometer for determining atomic emission characteristics; processor for receiving an output from the

spectrometer, analyzing said output to determine atomic composition, said processor predicting at least one of (i) an origin of the sample, (ii) a treatment applied to said sample, (iii) a composition of the sample, and (iv) a feedback signal for controlling a process. Calibration samples are also provided for standardizing readings from the spectrometer.

USD595609: Round cut precious stone
Applicant: Rosy Blue, United States of America
Publication: 2009-07-07
Filed: 2009-01-16
Status: granted

The ornamental design for a round cut precious stone, as shown.

WO2009094432A1: Cut gemstone exhibiting excellent optical brilliance
Applicant: Hasenfeld-Stein, United States of America
Publication: 2009-07-30
Filed: 2009-01-22
Status: application

A gemstone i.e. princess cut diamond, having 65 uniquely arranged and angled facets, 25 of which are In the crown, and 40 of which are in the pavilion. The height of the crown is preferably between 9 1/2 to 13 1/2 % of the width of the stone, the total depth of the stone is preferably between 63-70.9% of the width of the stone, and the width of the table is preferably between 60-68% of the width of the stone.

US20090183525A1: Cut Gemstone Exhibiting Excellent Optical Brilliance
Applicant: Hasenfeld-Stein, Inc.
Publication: 2009-07-23
Filed: 2009-01-22
Status: application

A gemstone including a substantially rectangular girdle, a crown extending in a first direction from the girdle, and a pavilion extending in a second direction from the girdle opposite the first direction. The gemstone has 65 uniquely arranged and angled facets, 25 of which are in the crown, and 40 of which are in the pavilion. The height of the crown is preferably between 9½ to 13½% of the width of the stone, the total depth of the stone is preferably between 63-70.9% of the width of the stone, and the width of the table is preferably between 60-68% of the width of the stone. The crown has four sides, a table, and four bezel facets each positioned at a respective corner of the crown. Each of the four sides of the crown have a first break extending from the girdle toward the table, a second break extending from the first break toward the table, a third break extending from the second break to the table, and a pair of star facets provided between the third break and the bezel facets at each corner of respective side of the crown. Preferably, and relative to

a plane parallel to a surface of the table, the first break is cut at an angle of approximately 35-45°, the second break is cut at an angle of approximately 30-40°, the third break is cut at an angle of approximately 25-35°, and the bezel facets are cut at an angle of approximately 20-30°.

US20090178438A1: Decagonal shaped diamond which displays hearts and arrows pattern
Applicant: -
Publication: 2009-07-16
Filed: 2008-09-16
Status: application

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

US20090182520A1: Assessment of diamond color
Applicant: -
Publication: 2009-07-16
Filed: 2006-12-12
Status: application

Determining relationship between spectral data and color quality of diamond for assessing color quality of diamond involves acquiring absorption spectra of group of diamonds; determining color quality of each diamond; and spectra processing

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US7571060: System and method for gemstone cut grading
Applicant: Gemological Institute of America (GIA), United States of America
Publication: 2009-08-04
Filed: 2004-09-27
Status: granted

A system for grading the cut of a diamond utilizes a number of appearance metrics to generate scores for a number of cut components that affect cut quality. These cut components include brightness, fire, scintillation, overweight, durability, polish, and symmetry. The cut grading system employs a cut grading algorithm that processes the individual scores obtained for the cut components to generate an overall cut grade for the diamond. The scoring methodology and the cut grading algorithm are designed to

emulate actual observation grading such that the overall cut grade represents a fair indication of the cut quality of the diamond. In one practical embodiment, the cut grading system is fully automated and computer-implemented.

US20090180100A1: Engraved gemstone viewer
Applicant: Gemex Systems, United States of America
Publication: 2009-07-16
Filed: 2008-12-23
Status: application

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

WO2009087763A1: Ornamental diamond having two-stage pavilion
Applicant: Hohoemi Brains, Japan
Publication: 2009-07-16
Filed: 2008-01-09
Status: application

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

WO2009087762A1: Ornamental diamond having two-stage pavilion
Applicant: Hohoemi Brains, Japan

Publication: 2009-07-16
Filed: 2008-01-09
Status: application

An ornamental diamond having a two-stage pavilion. The ornamental diamond is extremely bright and has many reflection patterns when observed from above its table facet or crown surface. The ornamental diamond has the same crown as a round-brilliant-cut diamond has, and has a pavilion divided into first and second pavilions by a horizontal segmentation plane. Lower girdle facets and pavilion main facets are bent by the horizontal segmentation plane between the first and second pavilions with a first pavilion angle larger than a second pavilion angle. Therefore, the ornamental diamond having the two-stage pavilion is far more brilliant than a conventional round-brilliant-cut diamond and has twice as many reflection patterns as the same has.

WO2009091376A2: Method and apparatus for high-pressure atomic-beam laser induced deposition/etching
Applicant: Los Alamos National Security, United States of America
Publication: 2009-07-23
Filed: 2008-10-21
Status: application

A method for carrying out pulsed laser deposition is disclosed. The method comprises providing a target having a desired composition; irradiating the target with a pulsed laser beam to provide a plume of target material; and directing the plume in a desired direction by use of an inert carrier gas. The plume of target material is passed through an aperture to create an atomic beam. One or both of the plume or the atomic beam is irradiated to reduce the amount of agglomerated particles in the atomic beam. The atomic beam is directed onto a substrate to produce a deposition product. An apparatus for carrying out the method is also disclosed.

JP2009518259T2: A method of improving the crystalline perfection of diamond crystals
Applicant: Element Six Technologies, South Africa
Publication: 2009-05-07
Filed: 2005-12-09
Status: translation

Grown high pressure and high temperature diamond material with a nitrogen concentration less than five parts per million has extended defect density

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JP2009090447A2: Cut of diamond in flat plate shape
Applicant: Matsuda Yoko
Publication: 2009-04-30

Filed: 2007-10-03
Status: application

Problem to be solved: To widely express the beauty of the transparence of a diamond by cutting the diamond in a flat shape though a diamond has been ground three-dimensionally to have a large number of cuts for increasing the brightness.
Solution: The diamond cut in a flat plate shape is cut in various flat designs to express the transparence and brightness of the diamond itself in a variety of fresh designs. Beautiful ornaments such as earrings and pendants in which the transparence and brightness of the diamond itself are utilized can be provided.

EP2074564A2: Diamond valuation method, apparatus and computer readable medium product
Applicant: Rosy Blue, United Arab Emirates
Publication: 2009-07-01
Filed: 2007-07-30
Status: application

Diamond valuation method for determining the true value of a diamond, involves calculating total adjusted price of selected diamond based on determined shape, size, color, clarity, cut and other parameters of selected diamond

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US20090202421A1: Synthetic diamonds prepared from roses
Applicant: -
Publication: 2009-08-13
Filed: 2009-04-17
Status: application

The present invention relates to a method of making a more permanent remembrance from a gift that includes organic material, wherein the gift has ephemeral beauty and symbolizes the feelings of a gift-giver toward a recipient. This method includes transforming the ephemeral beauty of the gift to a more permanent or eternal manifestation that symbolizes the feelings of the gift-giver toward the recipient. This result is conveniently achieved by initially converting the gift into carbon or a carbon-containing compound that is suitable for preparing a synthetic diamond, and then converting the carbon or carbon-containing compound under suitable pressure and temperature conditions to form a gem quality synthetic diamond.

US20090200157A1: Method for the production of diamond
Applicant: -
Publication: 2009-08-13
Filed: 2008-02-07
Status: application

An object of this invention is to provide a method for the production of diamond at a high rate and in a high efficiency using in-liquid plasma. In order to solve the above problems, the present invention relates to a method for the production of diamond, characterized in that, electromagnetic wave is irradiated to a liquid containing carbon, hydrogen and oxygen in which the ratio of hydrogen atoms to the sum of carbon atoms and hydrogen atoms is from 0.75 to 0.82 and the ratio of carbon atoms to the sum of carbon atoms and oxygen atoms is from 0.47 to 0.58 so as to generate plasma in the liquid whereby diamond is manufactured.

US7580118: Methods, apparatus, and systems for evaluating gemstones
Applicant: American Gem Society, United States of America
Publication: 2009-08-25
Filed: 2008-05-22
Status: granted

A method for imaging a gemstone, the method comprising:

illuminating a gemstone with light from different directions, wherein light incident on the gemstone from a first range of ray directions and a second range of ray directions have a first color and a second color, respectively, and the first and second ranges and first and second colors are different; acquiring an image of the gemstone while illuminating the gemstone; relaying said image of said gemstone to a location remote from where said image was acquired; and analyzing the image of the gemstone at said remote location to provide information related to the quality of the gemstone based on the analysis; wherein the first range of ray directions corresponds to light incident on the gemstone from polar angles from about 45° to about 75° with respect to a hemispherical reference frame centered on the gemstone.

US7575425: Assembly for HPHT processing
Applicant: -
Publication: 2009-08-18
Filed: 2006-08-31
Status: granted

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.

US20090210086A1: Systems and methods for sorting irregular objects
Applicant: MKS instruments, United States of America
Publication: 2009-08-20
Filed: 2008-12-17

Status: application

A system and method is provided for computerized sorting irregular objects. The method includes receiving a representative set of irregular objects comprising at least two types of user-specified qualities. The method also includes receiving at least two types of measured data for the representative set of irregular objects. The method also includes generating at least one of a PCA model or a PLS model based on at least two user-specified qualities of the irregular objects and the at least two types of measured data for the representative set of irregular objects, and sorting a second set of irregular objects based on the at least one of the PCA model or the PLS model.

US20090192938A1: Uncle Gem IV, Universal Automatic Instant Money, Data and Precious Metal and Stone Transfer Machine
Applicant: -
Publication: 2009-07-30
Filed: 2006-08-21
Status: application

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

WO2009099130A1: Polycrystalline diamond
Applicant: Sumitomo electric industries, Japan
Publication: 2009-08-13
Filed: 2009-02-05
Status: application

Polycrystalline diamond usable in many applications is provided. Also provided are a water-jetting orifice, stylus tool for gravure printing, scriber tool, diamond tool for

cutting, and scribing wheel each employing the polycrystalline diamond. The polycrystalline diamond is one obtained from non-diamond carbon by conversion and sintering under ultrahigh-pressure high-temperature conditions without the need of adding any sintering aid or catalyst. The polycrystalline diamond is characterized in that the diamond sinter grains constituting the polycrystalline diamond have an average grain diameter of 50-2,500 nm, excluding 50 nm and 2,500 nm, and that the diamond has a purity of 99% or higher and a D90 grain diameter not larger than [(average grain diameter)+(average grain diameter)×0.9].

WO2009106023A1: Method of making nucleation layer for diamond growth

Applicant: Institute of Physics of the Academy of Sciences, Czech Republic
Publication: 2009-09-03
Filed: 2009-02-18
Status: application

fabrication of a nucleation layer for the growth of diamond by chemical vapor deposition based on the addition of diamond powder into a solution of a polymer, homogenization of the resulting suspension, deposition of the resulting polymer composite on a substrate, annealing of the fabricated structure to the temperature corresponding to the hardening temperature of the used polymer and etching away of the polymer composite. This procedure gets the substrate ready for the growth of diamond or its ultra-thin layers by chemical vapor deposition. The polymer composite can be deposited in one or more layers. The polymer composite can also be deposited on the substrate selectively using basic lithographic techniques, which leads to the growth of diamond in geometrically predefined patterns on the substrate allowing for the fabrication of layered diamond structures in one technological process.

JP2009100920A2: Diamond having 99 facets

Applicant: London Diamond Gallery
Publication: 2009-05-14
Filed: 2007-10-23
Status: application

Problem to be solved: To provide a facet proportion of a diamond which is capable of acquiring more brightness than a conventional diamond by introducing more light into the interior and reflecting the introduced light on more facets.
Solution: The diamond has 33 facets (cut faces) on the crown as a standard brilliant cut diamond, and has an approximately hexadecagonal shape when viewed from the top. The diamond has 23 girdle facets on the girdle in total, the girdle facets have 16 relatively large girdle facets and relatively small girdle facets. The vertical dimension of the girdle is within the range of 25-30% of the total dimension from the upper surface of the crown to the apex of the bottom of the pavilion. The diamond has 43 facets on the pavilion in total including 7 small lower girdle facets and 12 extra facets disposed around the apex of

the bottom. In this way, the diamond has 99 facets in total.

JP2009046319A2: Functionalized diamond material and its production method
Applicant: National Institute Of Advanced Industrial & Technology
Publication: 2009-03-05
Filed: 2007-08-13
Status: application

Problem to be solved: To provide a diamond material which has sulfur functional groups having been safely and briefly introduced onto the surface of the diamond material without using a toxic gas, a special reaction vessel, and a special technique and without performing complicated operation.
Solution: Provided are a diamond material having sulfur-containing functional groups bonded to the surface of the diamond material, a metal microparticle-modified diamond material having metal microparticles bonded thereto through the sulfur-containing functional groups and a metal membrane-modified diamond material bonded to a metal membrane through the sulfur-containing functional groups. A diamond material is reacted with simple sulfur under the irradiation of ultraviolet ray to bond the sulfur-containing functional groups to the surface of the diamond material, to obtain a diamond material having the sulfur-containing functional groups bonded to its surface.

CN21294933Y:
Applicant: -
Publication: 2009-08-26
Filed: 2008-10-21
Status: granted patent for utility model

Jewellery colored diamond, has surface composed of symmetric planes that are crossed with each other, and main plane whose periphery is provided with symmetric planes, where structure of diamond is in round, heart or egg shape

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WO2009114130A2: Process and apparatus for diamond synthesis
Applicant: Michigan State University United States of America, Fraunhofer USA, United States of America
Publication: 2009-09-17
Filed: 2009-03-10
Status: application

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

for high power radiation and electron beams, and detectors.

WO2009111415A1: System and method for diamond deposition using a liquid-solvent carbon-transfer mechanism
Applicant: -
Publication: 2009-09-11
Filed: 2009-03-02
Status: application

A system and method for growing diamond crystals from diamond crystal seeds by epitaxial deposition at low temperatures and atmospheric and comparatively low pressures. A solvent is circulated (by thermal convection and/or pumping), wherein carbon is added in a hot leg, transfers to a cold leg having, in some embodiments, a range of progressively lowered temperatures and concentrations of carbon via the circulating solvent, and deposits layer-by-layer on diamond seeds located at the progressively lower temperatures since as diamond deposits the carbon concentration lowers and the temperature is lowered to keep the solvent supersaturated. The solvent includes metal(s) or compound(s) that have low melting temperatures and transfer carbon at comparatively low temperatures. A controller receives parameter signals from a variety of sensors located in the system, processes these signals, and optimizes diamond deposition by outputting the necessary control signals to a plurality of control devices (e.g., valves, heaters, coolers, pumps).

US20090239078A1: Process and apparatus for diamond synthesis
Applicant: Board of Trustees of Michigan State University, United States of America
Fraunhofer USA, United States of America
Publication: 2009-09-24
Filed: 2009-03-10
Status: application

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

US7594968: Ultratough CVD single crystal diamond and three dimensional growth thereof
Applicant: Carnegie Institution of Washington, United States of America
Publication: 2009-09-29

Filed: 2005-09-09
Status: granted

The invention relates to a single-crystal diamond grown by microwave plasma chemical vapor deposition that has a toughness of at least about 30 MPa m1/2. The invention also relates to a method of producing a single-crystal diamond with a toughness of at least about 30 MPa m1/2. The invention further relates to a process for producing a single crystal CVD diamond in three dimensions on a single crystal diamond substrate.

US20090245623A1: Systems and Methods for Gemstone Identification and Analysis
Applicant: -
Publication: 2009-10-01
Filed: 2009-03-31
Status: application

Images of items of jewelry having gemstones embedded therein are imaged and analyzed to determine the weights associated with the gemstones and, separately the precious metal in which the gemstones are encased without having to remove the gemstones from the jewelry.

WO2009121007A1: Global investment grade for natural and synthetic gems used in financial investments and commercial trading and method of creating standardized baskets of gems to be used in financial and commercial products
Applicant: Gemshares LLC, United States of America
Publication: 2009-10-01
Filed: 2009-03-27
Status: application

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

JP04302964B2
Applicant: -
Publication: 2009-07-29
Filed: 2002-11-01

Status: granted

Rectangular brilliant cut diamond has pavilion main facet with lower apex on the center line while another apex coincides with a side owned by adjacent main facet on a plane passing the centerline and center between lower vertexes of girdle

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JP2009114062A2: Diamond single crystal substrate and method of manufacturing diamond single crystal
Applicant: Sumitomo Electric
Publication: 2009-05-28
Filed: 2009-02-13
Status: application

Problem to be solved: To provide a high quality, large area diamond single crystal which does not generate crack and distortion when in crystal growth.
Solution: A method of manufacturing a diamond single crystal comprises a process of preparing a diamond single crystal substrate as a platy seed crystal having a thickness of not greater than 100 μm, and a process of forming a diamond single crystal on the diamond single crystal substrate by a vapor phase synthesis method. The process of preparing the diamond single crystal substrate comprises a process of preparing a diamond single crystal substrate having a thickness of greater than 100 μm, and a process of removing a part of the diamond single crystal substrate to be not greater than 100 μm thick.

JP2009137779A2: Method for manufacturing diamond single crystal substrate and diamond single crystal substrate
Applicant: Sumitomo Electric
Publication: 2009-06-25
Filed: 2007-12-04
Status: application

Problem to be solved: To provide a method for fast manufacturing a diamond single crystal substrate having a large area and high quality to be used for semiconductor materials, electronic components, optical components, cutting/polishing tools and the like.
Solution: The method for manufacturing a diamond single crystal substrate includes: arranging a plurality of diamond single crystal substrates with directions of crystal planes of principal planes substantially aligned to the <100> direction as a seed substrate 1; and growing a diamond single crystal by a vapor phase synthesis method on the seed substrate 1. The direction of the crystal plane on the principal plane of the seed substrate 1 has a gradient of 5 degrees or smaller with respect to the {100} plane. A growth parameter α in a first stage is from 2.0 to less than 3.0, while the parameter α in a second stage is not less than 3.0.

JP2009066627A2: Polishing method using laser beam machining, polishing device, and polished cutting tool
Applicant: Aisin Seiki
Publication: 2009-04-02
Filed: 2007-09-13
Status: application

Problem to be solved: To obtain a polishing depth invariable of a distance from a cutting edge ridgeline without causing microcracks and the graphitization of diamond particles by a polishing.
Solution: The polishing method using a laser beam machining comprises: a cross-sectional diameter-fixing step where the cross-sectional diameter of a focusing beam machining energy region when a repeated ultrashort light pulse laser beam is focused with a focusing lens is made almost fixed in a prescribed range to the direction of the optical axis of the focusing lens; an optical axis regulation step where the optical axis of the focusing lens is adjusted so as to be almost parallel to the polishing face in a polishing object; a focusing beam west part adjustment step where the focusing beam west part of an ultrashort light pulse laser beam by the focusing lens is regulated so as to be present at the polishing part; and a movement step where the focusing beam west part by the focusing lens is relatively moved at a prescribed moving velocity along the polishing part.
US7596967: Encrusted diamond
Applicant: Camellia Diamonds, Israel
Publication: 2009-10-06
Filed: 2006-10-25
Status: granted

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

WO2009073576A3: Gemstones and methods for controlling the appearance thereof
Applicant: California institute of Technology, United States of America
Publication: 2009-10-22
Filed: 2008-11-28
Status: application

Methods of fabricating improved gemstones and gemstones thus obtained are described. Roughness is introduced on facets of a gemstone through application of nanometer and/or micrometer sized features, to provide the facets with a hazy white-colored appearance.

Alternatively, millimeter-sized reflective features can be applied on the facets, to form a gemstone with improved scintillation or play of light.

US20090266109A1: Sliced and cut diamond national jewelry
Applicant: -
Publication: 2009-10-29
Filed: 2009-04-16
Status: application

Jewelry containing at least one stone being specifically cut for replicating a shape of a country of origin of a wearer. The jewelry includes a setting and a stone. The stone is set in the setting, and is specifically cut for replicating the shape of the country of origin of the wearer of the article of jewelry.

US20090260396A1: Methods for processing ornamental diamonds and corresponding ornamental diamonds
Applicant: -
Publication: 2009-10-22
Filed: 2008-04-16
Status: application

A method for processing diamonds and corresponding ornamental diamond structures employ diamonds having visible cloud inclusions. The diamond is cut and polished to form crown and pavilion facets angled so as to form a light transmission window over a readily noticeable portion of an area of the diamond. This renders a geometrical form of the cloud inclusion readily visible to the unaided human eye. Preferably, a major part of the light transmission window is formed by a primary table facet of the crown and a primary base facet of the pavilion angled which are roughly parallel to each other.

US20090258229A1: Method of improving the crystalline perfection of diamond crystals
Applicant: -
Publication: 2009-10-15
Filed: 2005-12-09
Status: application

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

US20090257942A1: Device and method for growing diamond in a liquid phase
Applicant: -
Publication: 2009-10-15
Filed: 2009-04-14
Status: application

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

US20090255457A1: System and method for epitaxial deposition of a crystal using a liquid-solvent fluidized-bed mechanism
Applicant: -
Publication: 2009-10-15
Filed: 2009-06-15
Status: application

A system and method for growing diamond crystals from diamond crystal seeds by epitaxial deposition at low temperatures and atmospheric and comparatively low pressures. A solvent is circulated (by thermal convection and/or pumping), wherein carbon is added in a hot leg, transfers to a cold leg having, in some embodiments, a range of progressively lowered temperatures and concentrations of carbon via the circulating solvent, and deposits layer-by-layer on diamond seeds located at the progressively lower temperatures since as diamond deposits the carbon concentration lowers and the temperature is lowered to keep the solvent supersaturated. The solvent includes metal(s) or compound(s) that have low melting temperatures and transfer carbon at comparatively low temperatures. A controller receives parameter signals from a variety of sensors located in the system, processes these signals, and optimizes diamond deposition by outputting the necessary control signals to a plurality of control devices (e.g., valves, heaters, coolers, pumps).

US7610242: Systems and methods for improving the liquidity and distribution network for luxury and other illiquid items
Applicant: BGC Partners, United States of America
Publication: 2009-10-27
Filed: 2007-02-05
Status: granted

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

US7604846: Manufacturing method of colored diamond by ion implantation and heat treatment

Applicant: Korea Atomic Energy Research Institute, Republic of Korea
Publication: 2009-10-20
Filed: 2005-02-28
Status: granted

The present invention relates to a manufacturing method of colored diamond and, more particularly, to a manufacturing method of colored diamond by ion implantation and heat treatment. The manufacturing method comprises a first step of implanting ions to the surface of diamond by accelerating the ions under vacuum, and a second step of heat-treating the implanted diamond. By implanting ions inducing the change in the optical band gap of a diamond, the manufacturing method provides a colored diamond with relatively lower cost compared to a metal ion implantation in the prior art, and a uniform color is obtained by heat treatment. Additionally, the manufacturing method of the present invention provides a diamond having various colors with permanent color development effects, by controlling the condition of ion implantation and heat treatment.

WO2009122287A2: Systems and methods for gemstone identification and analysis

Applicant: The Jewellery Store, United Arab Emirates
Publication: 2009-10-08
Filed: 2009-03-31
Status: application

Images of items of jewelry having gemstones embedded therein are imaged and analyzed to determine the weights associated with the gemstones and, separately the precious metal in which the gemstones are encased without having to remove the gemstones from the jewelry.

US20090246370A1: Method to Produce Tone-Controlled Colors in Colorless Crystals
Applicant: -
Publication: 2009-10-01
Filed: 2008-08-22
Status: application

The embodiments of present invention provide method for imparting tone-controlled colors into colorless crystals such as gemstones or decorative objects by coating a atomically mixed thin film comprising of a color causing reagent and a toner material onto the surface of colorless gemstones or transparent crystals and subjecting them to a heat treatment to produce colors of desired shades in the crystals. The method employed is radiation-free, eco-friendly and avoid the use of any hazardous material. The method highlights that controlling the amount of toner material could easily control the shade of color induced by the colorant material. The coating of atomically mixed single film onto the surface of crystals results in reduction of diffusion time significantly at a reasonable temperature, to impart colors to crystals such as gemstones and colorless decorative objects.

JP2009165575A2: Jewel and its cutting method
Applicant: Shinei Shokai
Publication: 2009-07-30
Filed: 2008-01-15
Status: application

Problem to be solved: To provide a jewel with vivid, fresh, and heart-shaped brightness to a demander and its cutting method.
Solution: Multiple heart-shaped things are released in the world, but only an extremely monotonous impression is given to the jewels, i.e., most hearts are the heart-shapes to be swelled on the extension lines or outward, which is indicated by dashed-two dotted lines. The cutting method of the present invention provides a heart shape cut with a fresh movement by cutting inward from the dashed-two dotted lines. Freshness is also given to the whole part with the brightness of a 62-hedron including a 28-hedron in the upper part, a 32-hedron in the lower part, a culet, and a girdle surface.

JP2009142455A2: Diamond, diamond-shaped jewelry, and its cutting method
Applicant: Juho
Publication: 2009-07-02
Filed: 2007-12-14
Status: application

Problem to be solved: To provide a diamond and diamond-shaped jewelry further improving its brightness and brilliance of a conventional ideal cut diamond while retaining its size (diameter); and its cutting method.

Solution: This diamond and diamond-shaped jewelry is formed with a girdle, a crown having a table on the upper part of the girdle, and a pavilion in the lower part of the girdle, and has a culet angle of 98.5° and a pavilion angle of 40.75°. The angle of the upper-part crown is defined as between 19.00-27.00° with consideration given to the strength of the adjacency of the girdle with respect to a chip of the diamond.

JP2009114062A2: Diamond single crystal substrate and method of manufacturing diamond single crystal

Applicant: Sumitomo Electric Ind
Publication: 2009-05-28
Filed: 2009-02-13
Status: application

Problem to be solved: To provide a high quality, large area diamond single crystal which does not generate crack and distortion when in crystal growth.
Solution: A method of manufacturing a diamond single crystal comprises a process of preparing a diamond single crystal substrate as a platy seed crystal having a thickness of not greater than 100 μm, and a process of forming a diamond single crystal on the diamond single crystal substrate by a vapor phase synthesis method. The process of preparing the diamond single crystal substrate comprises a process of preparing a diamond single crystal substrate having a thickness of greater than 100 μm, and a process of removing a part of the diamond single crystal substrate to be not greater than 100 μm thick.

JP2009090447A2: Cut of diamond in flat plate shape

Applicant: Matsuda Yoko
Publication: 2009-04-30
Filed: 2007-10-03
Status: application

Problem to be solved: To widely express the beauty of the transparence of a diamond by cutting the diamond in a flat shape though a diamond has been ground three-dimensionally to have a large number of cuts for increasing the brightness.
Solution: The diamond cut in a flat plate shape is cut in various flat designs to express the transparence and brightness of the diamond itself in a variety of fresh designs. Beautiful ornaments such as earrings and pendants in which the transparence and brightness of the diamond itself are utilized can be provided.

JP2009137779A2: Method for manufacturing diamond single crystal substrate and diamond single crystal substrate

Applicant: Sumitomo Electric Ind
Publication: 2009-06-25
Filed: 2007-12-04

Status: application

Problem to be solved: To provide a method for fast manufacturing a diamond single crystal substrate having a large area and high quality to be used for semiconductor materials, electronic components, optical components, cutting/polishing tools and the like.
Solution: The method for manufacturing a diamond single crystal substrate includes: arranging a plurality of diamond single crystal substrates with directions of crystal planes of principal planes substantially aligned to the <100> direction as a seed substrate; and growing a diamond single crystal by a vapor phase synthesis method on the seed substrate. The direction of the crystal plane on the principal plane of the seed substrate has a gradient of 5 degrees or smaller with respect to the {100} plane. A growth parameter α in a first stage is from 2.0 to less than 3.0, while the parameter α in a second stage is not less than 3.0.

JP2009137773A2: Projection forming method
Applicant: Sumitomo Electric Ind, Hiroshima Univ
Publication: 2009-06-25
Filed: 2007-12-03
Status: application

Problem to be solved: To provide a projection forming method by which a projection can be formed with a relatively good precision in a base material such as diamond.
Solution: The projection forming method includes a step for forming a metal mask containing a metal, e.g., tungsten or the like on the surface to be processed of a base material such as diamond by irradiating the surface to be processed with a focused ion beam in an atmosphere containing the metal and a step for forming a projection (a projection; in the case when etching is performed until the metal mask is eliminated) in the base material by etching the base material by a RIE (Reactive Ion Etching) process using the metal mask.

CA2621225C: Laser marking system for gemstones and method of authenticating marking
Applicant: Kaplan Lazare, United States of America
Publication: 2009-11-03
Filed: 1996-11-14
Status: granted

A laser microinscribing system includes a Q-switched Nd:YLF laser with a harmonic converter producing an output of about 530 nm, an optical system including a focusing lens, a gemstone mounting holder that is displaceable along three axes for moving a workpiece such as a gemstone with respect to the optical system so that laser energy is presented to desired positions, an imaging system for viewing the gemston e from a plurality of viewpoints including a top CCD and a side CCD, a processor controlling the position of the holder based on marking instructions a nd a predetermined program, and a storage system for storing information relating to images of a plurality of workpieces. A

rigid frame supports the laser, t he optical system and the holder to increase immunity to vibrational misalignment s. A secure certificate of authenticity of a marked workpiece is preferably provide d having an image of the marking as well as the outline of a girdle of the gemstone.

CN10553516C: Oval cut diamond
Applicant: Hohoemi Brains, Japan
Publication: 2009-10-28
Filed: 2005-03-25
Status: application

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

CA2412855C: Thick single crystal diamond layer method for making it and gemstones produced from the layer
Applicant: Element Six, South Africa
Publication: 2009-10-20
Filed: 2001-06-14
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. The method involves the homoepitaxial growth of the diamond layer on a low defect density substrate in an atmosphere containing less than 300ppb nitrogen. Gemstones can be manufactured from the layer.

US20090290141A1: Matched pairs of gemstones
Applicant: -
Publication: 2009-11-26
Filed: 2009-05-12
Status: application

A system is provided for certifying two or more gemstones as being a matched pair. The system includes measuring values for at least four physical properties of a multiplicity of gemstones, identifying a first gemstone, a second gemstone, and optionally still further gemstones all being within match tolerances of the respective measured values, and certifying in a single certificate that based on the match tolerances, the gemstones constitute a matched set. Also disclosed is jewelry and a process for creating jewelry based on the certification system.

WO2009137020A1: Ultratough single crystal boron-doped diamond
Applicant: Carnegie Institution of Washington, United States of America
Publication: 2009-11-12
Filed: 2009-05-05
Status: application

The invention relates to a single crystal boron doped CVD diamond that has a toughness of at least about 22 MPa m1/2. The invention further relates to a method of manufacturing single crystal boron doped CVD diamond. The growth rate of the diamond can be from about 20-100 μm/h.

WO2009133393A1: Locating inclusions in diamond
Applicant: De Beers UK, United Kingdom
Publication: 2009-11-05
Filed: 2009-04-28
Status: application

A method and apparatus for locating features in a translucent or transparent object, and in particular a crystal such as diamond, is described. The method comprises identifying a window in the object and recording a first image of the window at a first orientation relative to an imaging means. Candidate features are identified in the first image. The object is then rotated relative to the imaging means, and a second image of the window, at a second orientation relative to the imaging means, is recorded. A search is automatically made for the candidate features in the second image. The location of those candidate features which are present in the first image and in the second image can then be identified. Alternatively or in addition, candidate features may be identified independently in each image, and a correlation between the features in the two images can then be carried out.

US20090291287A1: Coloured diamond
Applicant: Element Six Limited
Publication: 2009-11-26
Filed: 2009-04-01
Status: application

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

US20090286352A1: Diamond bodies grown on sic substrates and associated methods
Applicant: -
Publication: 2009-11-19
Filed: 2008-08-04
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.

US7615203: Single crystal diamond
Applicant: Sumitomo Electric Industries, Japan
Publication: 2009-11-10
Filed: 2005-05-26
Status: granted

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

JP2009167070A2: Processing method of diamond and processing device of diamond
Applicant: Lemi
Publication: 2009-07-30
Filed: 2008-01-19

Status: application

Problem to be solved: To provide a processing method and a processing device of diamonds, capable of processing and cutting a diamond main body to a linear or planar shape without influencing the diamond main body.
Solution: A high-harmonic conversion of a laser beam from an LD excited near-infrared laser is carried out with a high-harmonic converter to obtain a wavelength-converted laser beam with a wavelength of 266 nm; and the wavelength-converted laser beam with a wavelength of 266 nm is converted into a scan laser beam with a galvano-scanner and converged with a circular fθ lens, thus condensed as a convergence laser beam. The convergence laser beam is charged into diamond and absorbed by solid solution nitrogen contained in diamond; and thermal energy processing of the diamond is carried out by ablation and evaporation.