

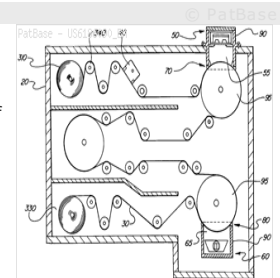
1) Family number: 29459015 (US6186090B)

APPARATUS FOR THE SIMULTANEOUS DEPOSITION BY PHYSICAL VAPOR DEPOSITION AND CHEMICAL VAPOR DEPOSITION AND METHOD THEREFOR

Abstract: Source: US6186090B Apparatus and method for the vacuum deposition of at least two different layers of thin film material onto a substrate by two different vacuum deposition processes. Also disclosed is a novel linear applicator for using microwave enhanced CVD to uniformly deposit a thin film of material over an elongated substrate.

Probable Assignee: ENERGY CONVERSION DEVICES INC

Earliest Publication Date: 20000908



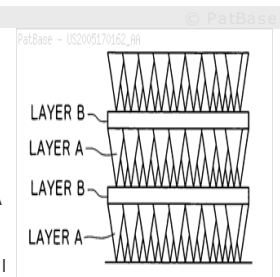
2) Family number: 32125070 (US2005170162A)

HARD LAMINATED FILM, METHOD OF MANUFACTURING THE SAME AND FILM-FORMING DEVICE

Abstract: Source: US2005170162A A hard laminated film wherein a layer A and a layer B having specific compositions are deposited alternately so that the compositions of layer A and layer B are different. The thickness of layer A per layer is twice or more the thickness of layer B per layer, the thickness of layer B per layer is 0.5 nm or more, and the thickness of layer A per layer is 200 nm or less. Layer A has a cubic rock-salt crystal structure such as that of Ti, Cr, Al, V nitride, carbonitride or carbide, and layer B is a hard film having a crystal structure other than cubic such as that of BN, BCN, SiN, SiC, SiCN, B-C, Cu, CuN, CuCN or metallic Cu. Alternatively, layer A has a chemical composition satisfying the following formula (1), and layer B has a chemical composition satisfying the following formula (2). Layer A: $\text{Cr}(\text{B}_a\text{C}_b\text{N}_{1-a-b}\text{O}_c)$ 0 less than or equal to a less than or equal to 0.15, 0 less than or equal to b less than or equal to 0.3, 0 less than or equal to c less than or equal to 0.1, 0.2 less than or equal to e less than or equal to 1.1 (1) Layer B: $\text{B}_{1-s-t}\text{C}_s\text{N}_t$ 0 less than or equal to s 0.25, (1-s-t)/t less than or equal to 1.5 (2) Alternatively, Layer A has a specific atomic ratio composition of $(\text{Ti}_{1-x-y}\text{Al}_x\text{M}_y)(\text{B}_a\text{C}_b\text{N}_{1-a-b-c}\text{O}_c)$ and Layer B has one or more specific atomic ratio compositions selected from among the compositions $\text{B}_{1-x-y}\text{C}_x\text{N}_y$, $\text{Si}_{1-x-y}\text{C}_x\text{N}_y$, C_{1-x}N_x , $\text{Cu}_{1-y}(\text{C}_x\text{N}_{1-x})_y$. Alternatively, Layer A has one of the following Compositional Formulae 1 or 2. Formula 1: $(\text{Ti}_{1-x-y}\text{Al}_x\text{M}_y)(\text{B}_a\text{C}_b\text{N}_{1-a-b-c}\text{O}_c)$, Formula 2: $(\text{Cr}_{1-\alpha}\text{X}\alpha)(\text{B}_a\text{C}_b\text{N}_{1-a-b-c}\text{O}_c)_e$ (X is one or more metal elements selected from among Ti, Zr, Hf, V, Nb, Ta, Mo, W, Al, Si. Layer B has the following compositional formula 3. Formula 3 $\text{M}(\text{B}_a\text{C}_b\text{N}_{1-a-b-c}\text{O}_c)$. M is one or more metal elements selected from among W, Mo, V, Nb.

Probable Assignee: KOBE SEIKO SHO KOBE STEEL LTD KK

Earliest Publication Date: 20050804



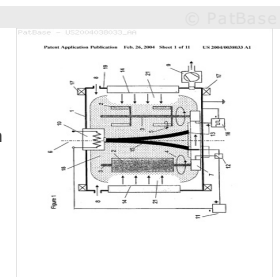
3) Family number: 42245878 (US2004038033A)

DLC LAYER SYSTEM AND METHOD FOR PRODUCING SAID LAYER SYSTEM

Abstract: Source: US2004038033A The invention describes a device and a process that render possible the production of a layer system for wear protection, corrosion protection and improvement of the slipping properties and the like with an adhesion layer to be arranged on a substrate, a transition layer to be arranged on the adhesion layer and a covering layer of diamond-like carbon, wherein the adhesion layer comprises at least one element of the group of elements that contains the elements of the fourth, fifth and sixth subgroup of the periodic table and silicon, the transition layer comprises carbon and at least one element of the aforesaid groups and covering layer consists essentially of diamond-like carbon, the layer system having a hardness of at least 15 GPa, preferably at least 20 GPa, and an adhesion of at least 3 HF according to VDI 3821, Sheet 4. The process used for the production of this layer system is such that the initial introduction of the substrate into a vacuum chamber and pumping to produce a vacuum of at least 10^{-4} mbar, preferably 10^{-5} mbar, is at first followed by the cleaning of the adhesion surface to remove any adhering impurities and then by the plasma-supported deposition of the adhesion layer. Subsequently the transition layer is applied by the simultaneous deposition of the components of the adhesion layer and the deposition of carbon from the gaseous phase by means of plasma-CVD. The diamond-like carbon layer is then applied solely by means of plasma-supported deposition of carbon from the gaseous phase. During the process a biasing voltage is applied to the substrate, this voltage being pulsed in the medium-frequency range, while a superposed magnetic field stabilizes the plasma in the individual process steps. An appropriate device for carrying out the coating process therefore consists of a vacuum chamber (1) with a pumping system (9) for the production of a vacuum in the vacuum chamber, substrate holding devices (3) to receive the substrates to be coated, at least one gas supply unit (18) for dosing the supply of process gas, at least one vaporizer device (14) to make available coating material for deposition, an arc generation device (10, 13) to ignite a low-voltage d.c. arc, a device (16) for the generation of a substrate biasing voltage and with at least one or several magnetic field generator devices (17) for the formation of a far magnetic field. The invention also describes a DLC-slipping layer system and a process for the production of such a system, which on its surface side is provided with an additional slipping layer.

Probable Assignee: OERLIKON TRADING TRUEBBACH AG

Earliest Publication Date: 20011025



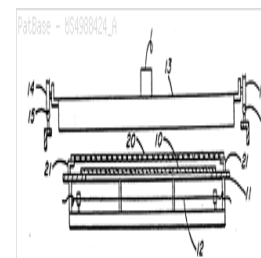
4) Family number: 4437311 (US4988424A)

MASK AND METHOD FOR MAKING GRADIENT SPUTTERED COATINGS

Abstract: Source: US4988424A Sputtered coatings of gradient thicknesses are produced by employing a foraminous mask between the cathode and the substrate. The size of openings in the foraminous mask may be varied in different areas to provide versatility in controlling the gradient patterns. The invention is particularly suitable for producing gradient electroconductive heating films on transparencies.

Probable Assignee: PPG IND OHIO INC

Earliest Publication Date: 19901208



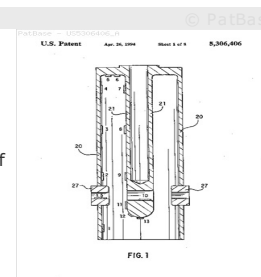
5) Family number: 8811795 (US5306406A)

METHOD AND APPARATUS FOR SPUTTERING SUPERCONDUCTING THIN FILMS OF NIOBIUM ON QUARTER-WAVE RESONANT CAVITIES OF COPPER FOR ACCELERATING HEAVY IONS

Abstract: Source: US5306406A A method of providing a thin film for lining quarter-wave resonant cavities of copper comprises the deposition of a superconducting material, in particular niobium, in the form of a micro-layer having a substantially constant thickness covering both the cylindrical surface of the cavity and its bottom formed of a plane plate, by biased-diode d.c. sputtering through emitting cathodes in a form fitting geometrically the surfaces to be lined.

Probable Assignee: IST NAZIONALE FISICA NUCLEARE

Earliest Publication Date: 19930215



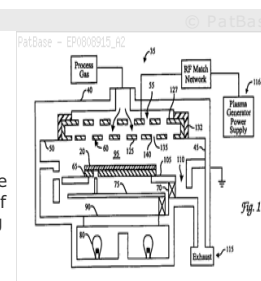
6) Family number: 11094536 (EP0808915A2)

CHEMICAL VAPOR DEPOSITION AND SPUTTERING METHOD AND APPARATUS

Abstract: Source: EP0808915A2 An apparatus (35) for depositing material on a substrate (20) by chemical vapor deposition and sputtering is described. The apparatus (35) comprises a deposition chamber (40) having a support (65) for supporting the substrate (20) in the chamber. A sputtering target (60) facing the substrate (20) in the chamber (40), has a sputtering surface comprising sputtering material. A plasma generator in the chamber (40) is used to generate a plasma from process gas introduced into the chamber. A gas distributor (55) is used to distribute process gas in the chamber (40), the process gas selected from the group consisting of (i) deposition gas capable of depositing a CVD layer on the substrate (20) by chemical vapor deposition, or (ii) sputtering gas capable of forming a plasma for sputtering the target (60) to deposit a sputtered layer on the substrate. Optionally, the apparatus (35) can also include a heater (80) for heating the substrate (20) to diffuse the CVD and sputtered layers into one another to form a substantially homogeneous diffusion mixture of the deposited and sputtered layers. The apparatus (35) is particularly useful for depositing multicomponent alloys on the substrate (20).

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19971126



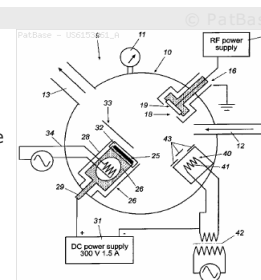
7) Family number: 12698560 (US6153061A)

METHOD OF SYNTHESIZING CUBIC BORON NITRIDE FILMS

Abstract: Source: US6153061A A method of forming cubic phase boron nitride films in which a hexagonal boron nitride film target is positioned in front of an RF magnetron sputtering gun and is impacted with ions to cause atoms of boron and nitrogen to be sputtered away from the target and toward a substrate. At the same time, electrons are emitted into the system by an electron emitter, which electrons are attracted to the substrate as the boron and nitrogen atoms are being deposited on the substrate. The electrons cause the boron and nitrogen atoms to be reformed on the substrate as cubic phase boron nitride while suppressing the formation of other, less desirable forms of boron nitride films.

Probable Assignee: AUBURN UNIV

Earliest Publication Date: 20001128



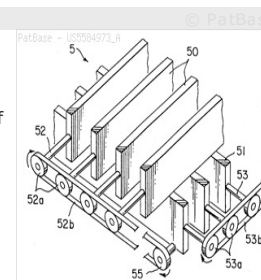
8) Family number: 12889930 (US5584973A)

PROCESSING APPARATUS WITH AN INVERTIBLE COLLIMATOR AND A PROCESSING METHOD THEREFOR

Abstract: Source: US5584973A A processing apparatus wherein a collimator which restricts sputtering directions of sputtered particles from a target comprises a plurality of slats arranged substantially parallel with each other. The respective slats constitute a louver mechanism in which rotatable rods are rotated to replace the side thereof facing the target and the side thereof facing the object-to-be-processed with each other. Because of the louver mechanism, the portion of the interior of a processing vessel belonging to the target and the portion thereof belonging to the object-to-be processed can be closed off from each other, and a side of the collimator facing the target and a side thereof facing the object-to-be-processed can be replaced with each other. As a result, the collimator has also a shutter function, and can suppress generation of particles.

Probable Assignee: TEL VARIAN KK

Earliest Publication Date: 19951222



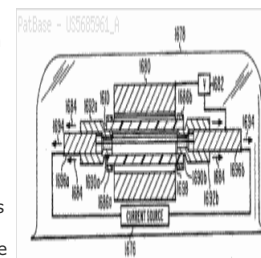
9) Family number: 13301439 (US5685961A)

METHOD FOR FABRICATION OF METALLIZED MEDICAL DEVICES

Abstract: Source: US5685961A Catheters and other medical devices include plural layers of metals applied to the outer surfaces, which tend to close minuscule cracks through which corrosion may attack the underlying support. In some avatars, the initial layer of material is preferably silver, applied following specific preparation steps. In other embodiments, succeeding layers of metal completely cover the initial layer, and are also of silver. The succeeding layers are deposited after deposition of the prior layer, and tend to reduce the incidence of microscopic pores or cracks and are less prone to delamination. The succeeding layers are preferably of mutually different metals between layers. In a particular avatar, in which the exposed metals are oligodynamic silver and more noble platinum, the exposed silver layer lies over a portion of the platinum layer, to thereby prevent corrosion of the silver layer from disconnecting portions of the silver layer. Fabrication methods include deposition of successive layers by means of sputtering in a longitudinal array of cylindrical magnetron sections, in which each section applies one layer of the coating over the coating applied by the preceding section. The magnetron sections may be energized and deenergized in a temporal pattern associated with the progress of the workpiece material through the array, to thereby cover or expose particular longitudinal layers. In some embodiments, a first layer of electrically conductive material is deposited by electroless methods particularly in the lumen, following which additional layers may be applied by conventional electrolytic deposition. An electroless method according to the invention includes preparation steps which may include ultrasonically cleaning the surface with a solution of isopropyl alcohol, then drying the surface with a stream of dry gas, and etching the surface with a solution of sodium naphthalene in diethylene glycol dimethyl ether.

Probable Assignee: P AND D MEDICAL COATINGS INC

Earliest Publication Date: 19971111



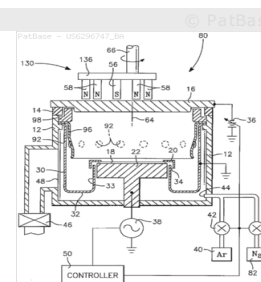
10) Family number: 15826031 (US6296747B)

BAFFLED PERFORATED SHIELD IN A PLASMA SPUTTERING REACTOR

Abstract: Source: US6296747B A shield assembly for protecting the walls of a plasma sputter reactor from deposition while allowing high flow of processing gas into the processing space of the reactor without the plasma leaking out of the processing space. The shield assembly is particularly useful for reactive sputtering, for example, of TiN or TaN, in which large amounts of nitrogen need to flow into the chamber. The shield assembly includes a primary shield positioned inside of the chamber sidewalls and protecting the sidewalls and preferably also the bottom wall and sides of the pedestal. Multiple holes are formed in the primary shield to pass gas input through a gas inlet in the chamber walls outside of the primary shield. A baffle shield in positioned inside of the primary shield and covers the holes in the primary shield with a gap between the two shields. The baffle shield extends only partway along the primary shield so that gap communicates with the processing space of the reactor. Preferably, both the primary and baffle shield are grounded to no electric field exists in the gap. The shield assembly is particularly useful for magnetron sputter reactors in which an axial magnetic field is generated parallel to the side portions of the primary shield.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20011002



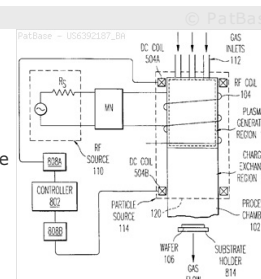
11) Family number: 23167981 (US6392187B)

APPARATUS AND METHOD FOR UTILIZING A PLASMA DENSITY GRADIENT TO PRODUCE A FLOW OF PARTICLES

Abstract: Source: US6392187B An apparatus and method which uses a plasma having a density gradient in order to accelerate ions, thereby producing a flow of energetic ions and neutral parties. The plasma gradient is produced by applying a non-uniform magnetic field to the plasma and/or providing non-uniform RF power to the plasma. Since the voltage within a plasma (i.e. the plasma potential) is dependent upon the density of the plasma, the plasma gradient produces an electric field within the plasma, which can be used to accelerate ions e.g., toward a substrate. This technique produces accelerated particles of lower energy than conventional systems, thereby causing less damage to a work piece being processed. In addition, since the ions accelerated by the apparatus have lower speeds than those accelerated by conventional systems, a larger proportion of the ions having time to recombine with free electrons before striking the work piece being processed. Since neutral particles are less damaging than ions, the amount of damage caused by the beam of accelerated particles is reduced further. As a result, manufacturing yields are increased, manufacturing costs are decreased, and improved lithographic resolution is possible, thereby improving performance and reducing the costs of circuits fabricated on a substrate.

Probable Assignee: TOKYO ELECTRON LTD

Earliest Publication Date: 19990422



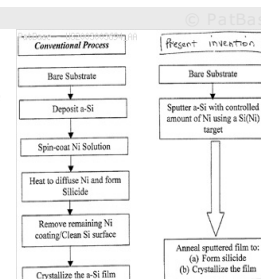
12) Family number: 27906667 (US2003003694A)

METHOD FOR FORMING SILICON FILMS WITH TRACE IMPURITIES

Abstract: Source: US2003003694A A method is provided for forming silicon films with a controlled amount of trace impurities. The method comprises: forming a target including silicon and a first concentration of a first impurity; supplying a substrate; and, sputter depositing a film of silicon on the substrate including a second concentration of the first impurity. The first impurity in the target can be a transition metal, phosphorous, or germanium. When the first impurity is Ni, the first concentration of nickel in the target is in the range of 0.01 to 0.5 percentage by atomic weight (at percent). Preferably the range is 0.05 to 0.2 at percent. Then, the second concentration of Ni in the deposited silicon film is in the range of 0.01 to 0.5 at percent.

Probable Assignee: SHARP LABORATORIES OF AMERICA INC

Earliest Publication Date: 20030102



13) Family number: 28220426 (US2002117399A)

ATOMICALLY THIN HIGHLY RESISTIVE BARRIER LAYER IN A COPPER VIA

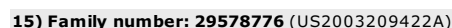
Abstract: Source: US2002117399A A method of forming a copper via and the resultant structure. A thin layer of an insulating barrier material, such as aluminum oxide or tantalum nitride, is conformally coated onto the sides and bottom of the via hole, for example, by atomic layer deposition (ALD) to a thickness of less than 5 nm, preferably less than 2 nm and having an electrical resistivity of more than 500 microhm-cm. A copper seed layer is then deposited under conditions such that copper is deposited on the via sidewalls but not deposited over most of the bottom of via hole. Instead energetic copper ions sputter the barrier material from the via bottom. Copper is electroplated into the via hole lined only on its sidewalls with the barrier. The invention preferably extends also to dual-damascene structures in which the copper seed sputter process sputters the barrier layer from the via bottom but not the trench floor.

Earliest Publication Date: 20020829



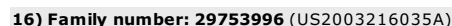
Abstract: Source: US6287430B The present invention is drawn to an apparatus for forming a thin film. The apparatus includes a vacuum chamber; a vacuum apparatus connected to the vacuum chamber; a holder placed in the vacuum chamber, which holder holds a substrate and is rotated by means of a rotating mechanism; a plasma CVD apparatus; and a sputtering apparatus, wherein the plasma CVD apparatus and the sputtering apparatus are placed in a single vacuum chamber and a thin film having an medium refractive index is formed on the substrate held by the holder, by means of the plasma CVD apparatus and the sputtering apparatus. The method making use of such an apparatus is also disclosed.

Earliest Publication Date: 20000118



Abstract: Source: US2003209422A A method and apparatus for depositing a film on a substrate comprising a deposition interval wherein DC power is applied to a target to form a first plasma and material is sputtered from the target onto a substrate and, during a subsequent forming interval, high frequency power is applied to the target to remove material from at least a portion of the substrate. The sputtering working gas admitted to the chamber may be maintained at a first pressure during the deposition interval and the pressure of the sputtering working gas may be increased to a second pressure during the forming interval.

Earliest Publication Date: 20031113

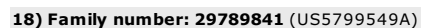


Abstract: Source: US2003216035A A physical vapor deposition chamber is employed to sputter-deposit a layer of material, such as a tantalum or tantalum nitride barrier layer, in a via formed on a semiconductor substrate. After the sputter-deposition step, a second processing step is performed in which material from the barrier layer is back-sputtered from the bottom wall of the via. The second step is performed at a high pedestal bias and with substantial power applied to the sputtering target. The power applied to the sputtering target in the second step may be at a higher level than the power applied to the sputtering target in the first step. Numerous other aspects are provided.

Earliest Publication Date: 20031120

Abstract: Source: US2003089601A An array of auxiliary magnets positioned along sidewalls of a magnetron sputter reactor on a side towards the wafer from the target. The magnetron preferably is a small, strong one having a stronger outer pole of a first magnetic polarity surrounding a weaker outer pole of a second magnetic polarity and rotates about the central axis of the chamber. The auxiliary magnets preferably have the first magnetic polarity to draw the unbalanced magnetic field component toward the wafer. The auxiliary magnets may be either permanent magnets or electromagnets.

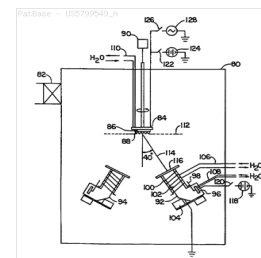
Earliest Publication Date: 20010411



Abstract: Source: US5799549A Improved razors and razor blades and processes for producing razor blades or similar cutting tools with sharp and durable cutting edges, by hard-carbon coating of blades with amorphous diamond, preferably using a filtered cathodic arc plasma source. A coating of amorphous diamond having at least 40 percent sp³ carbon bonding, a hardness of at least 45 gigapascals and a modulus of at least 400 gigapascals is applied to the sharpened edge of a substrate. The substrate may be mechanically honed, and there is no interlayer between the substrate and the amorphous diamond coating. The coating imparts stiffness and rigidity to a thin blade while maintaining a high aspect ratio.

Probable Assignee: GILLETTE CO LLC

Earliest Publication Date: 19951102



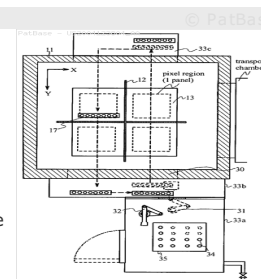
19) Family number: 30423918 (US2004123804A)

FABRICATION SYSTEM AND MANUFACTURING METHOD OF LIGHT EMITTING DEVICE

Abstract: Source: US2004123804A The present invention provides a vapor deposition method and a vapor deposition system of film formation systems by which EL materials can be used more efficiently and EL materials having superior uniformity with high throughput rate are formed. According to the present invention, inside a film formation chamber, an evaporation source holder in a rectangular shape in which a plurality of containers sealing evaporation material is moved at a certain pitch to a substrate and the evaporation material is vapor deposited on the substrate. Further, a longitudinal direction of an evaporation source holder in a rectangular shape may be oblique to one side of a substrate, while the evaporation source holder is being moved. Furthermore, it is preferable that a movement direction of an evaporation source holder during vapor deposition be different from a scanning direction of a laser beam while a TFT is formed.

Probable Assignee: SEMICONDUCTOR ENERGY LAB CO LTD

Earliest Publication Date: 20040401



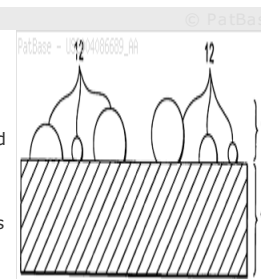
20) Family number: 30550997 (US2004086689A)

ISLAND PROJECTION-MODIFIED PART, METHOD FOR PRODUCING THE SAME, AND APPARATUS COMPRISING THE SAME

Abstract: Source: US2004086689A In film-forming devices and plasma-processing devices, filmy matter adheres to the surfaces of the inner parts and it peels to cause dust and particles in the devices. In the devices, the dust and particles contaminate the objects for film formation thereon or the objects to be processed with plasma. For preventing the objects from being contaminated with them, the inner parts of the devices must be frequently exchanged every time when they have received any minor filmy matter thereon, and this lowers the productivity in the devices. When a modified glass part of which the surface is modified with spherical or bell-like island projections having a width and a height of from a few mum to a few hundreds mum is used in a film-forming device and in a plasma-processing device, then its ability to hold the filmy substance having adhered thereto is good and its resistance to plasma is also good. Therefore, the surface-modified part does not produce dust and particles and solves the problem of contamination of products. In addition, since the surface-modified part of the type has few pores and therefore releases few particles and little gas. Moreover, since the stress to be caused by the thermal expansion difference between the island projections and the substrate of the surface-modified part is small, the part does not peel even when heated, and it is favorable to vacuum devices.

Probable Assignee: TOSOH CORP

Earliest Publication Date: 20040506



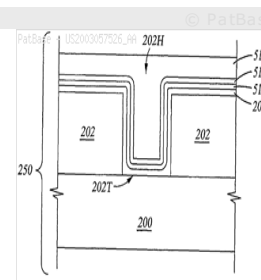
21) Family number: 30571616 (US2003057526A)

INTEGRATION OF BARRIER LAYER AND SEED LAYER

Abstract: Source: US2003057526A The present invention generally relates to filling of a feature by depositing a barrier layer, depositing a seed layer over the barrier layer, and depositing a conductive layer over the seed layer. In one embodiment, the seed layer comprises a copper alloy seed layer deposited over the barrier layer. For example, the copper alloy seed layer may comprise copper and a metal, such as aluminum, magnesium, titanium, zirconium, tin, and combinations thereof. In another embodiment, the seed layer comprises a copper alloy seed layer deposited over the barrier layer and a second seed layer deposited over the copper alloy seed layer. The copper alloy seed layer may comprise copper and a metal, such as aluminum, magnesium, titanium, zirconium, tin, and combinations thereof. The second seed layer may comprise a metal, such as undoped copper. In still another embodiment, the seed layer comprises a first seed layer and a second seed layer. The first seed layer may comprise a metal, such as aluminum, magnesium, titanium, zirconium, tin, and combinations thereof. The second seed layer may comprise a metal, such as undoped copper.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20030327



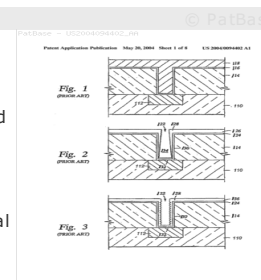
22) Family number: 30572298 (US2004094402A)

SELF-IONIZED AND CAPACITIVELY-COUPLED PLASMA FOR SPUTTERING AND RESPUTTERING

Abstract: Source: US2004094402A A DC magnetron sputter reactor for sputtering deposition materials such as tantalum and tantalum nitride, for example, and its method of use, in which self-ionized plasma (SIP) sputtering and capacitively coupled plasma (CCP) sputtering are promoted, either together or alternately, in the same chamber. Also, bottom coverage may be thinned or eliminated by inductively-coupled plasma (ICP) resputtering. SIP is promoted by a small magnetron having poles of unequal magnetic strength and a high power applied to the target during sputtering. CCP is provided by a pedestal electrode which capacitively couples RF energy into a plasma. The CCP plasma is preferably enhanced by a magnetic field generated by electromagnetic coils surrounding the pedestal which act to confine the CCP plasma and increase its density.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20040520



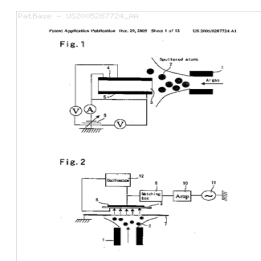
23) Family number: 30688279 (US2005287724A)

TRANSPARENT CONDUCTIVE FILMS AND PROCESSES FOR FORMING THEM

Abstract: Source: US2005287724A A target containing an indium oxide and a tin oxide is used and sputtered particles from the target are transported by a forced gas flow of a sputter gas onto an organic substrate and deposited on the organic substrate while applying a DC bias voltage or an RF bias voltage to the organic substrate. The organic substrate is close to the target so that it is positively acted on by plasma. Thus, an ITO transparent conductive film having a resistivity of 10^{-3} ohm.cm or less is formed on the organic substrate. The formed ITO transparent conductive film has a ratio of 1:1 or more and 4:1 or less between the peak intensity the (222) plane and the peak intensity of the (400) plane of the indium tin oxide in X-ray diffraction.

Probable Assignee: SONY CHEMICAL AND INFORMATION DEVICE CORP

Earliest Publication Date: 20040701



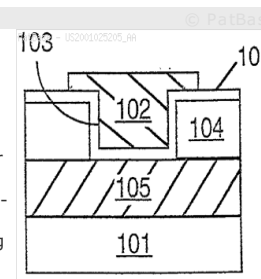
24) Family number: 31044442 (US2001025205A)

CONSTRUCTION OF A FILM ON A SEMICONDUCTOR WAFER

Abstract: Source: US2001025205A The construction of a film on a wafer, which is placed in a processing chamber, may be carried out through the following steps. A layer of material is deposited on the wafer. Next, the layer of material is annealed. Once the annealing is completed, the material may be oxidized. Alternatively, the material may be exposed to a silicon gas once the annealing is completed. The deposition, annealing, and either oxidation or silicon gas exposure may all be carried out in the same chamber, without need for removing the wafer from the chamber until all three steps are completed. A semiconductor wafer processing chamber for carrying out such an in-situ construction may include a processing chamber, a showerhead, a wafer support and a rf signal means. The showerhead supplies gases into the processing chamber, while the wafer support supports a wafer in the processing chamber. The rf signal means is coupled to the showerhead and the wafer support for providing a first rf signal to the showerhead and a second rf signal to the wafer support.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19960515



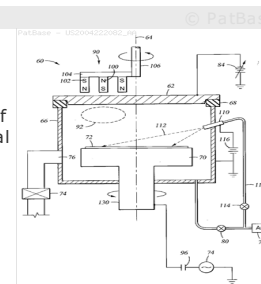
25) Family number: 31328111 (US2004222082A)

OBLIQUE ION MILLING OF VIA METALLIZATION

Abstract: Source: US2004222082A In conjunction with sputtering a metal, especially copper, into high aspect-ratio holes in a wafer, an oblique ion milling method in which argon ions or other particles having energies in the range of 200 to 1500 eV are directed to the wafer at between 10 and 35 degrees to the wafer surface to sputter etch material sputter deposited preferentially on the upper corners of the holes. The milling may be performed in the sputter deposition chamber either simultaneously with the deposition or after it or performed afterwards in a separate milling reactor. A plurality of ion sources arranged around the chamber improve angular uniformity or arranged axially improve radial uniformity or vary the angle of incidence. An annular ion source about the chamber axis allows a plasma current loop. Anode layer ion sources and sources composed of copper are advantageous.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20041111



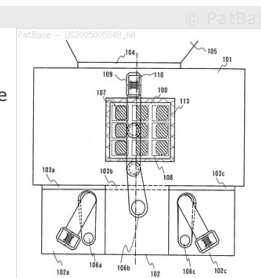
26) Family number: 31436003 (US2005005848A)

APPARATUS FOR FORMING A FILM AND AN ELECTROLUMINESCENCE DEVICE

Abstract: Source: US2005005848A A device having three evaporation sources and a unit for moving the respective evaporation sources in one chamber is used, whereby it becomes possible to increase efficiency of use of an evaporation material. Consequently, manufacturing cost can be reduced, and a uniform thickness can be obtained over an entire surface of a substrate even in the case in which a large area substrate is used.

Probable Assignee: SEMICONDUCTOR ENERGY LAB CO LTD

Earliest Publication Date: 20041104



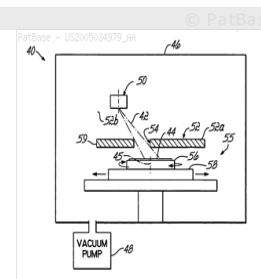
27) Family number: 31571503 (US2005034979A)

METHOD AND APPARATUS FOR SURFACE PROCESSING OF A SUBSTRATE

Abstract: Source: US2005034979A Method and apparatus for processing a substrate with a beam of energetic particles. The beam is directed from a source through a rectangular aperture in a shield positioned between the source and substrate to a treatment zone in a plane of substrate movement. Features on the substrate are aligned parallel to a major dimension of the rectangular aperture and the substrate is moved orthogonally to the aperture's major dimension. The beam impinges the substrate through the aperture during movement. The substrate may be periodically rotated by approximately 180 degrees to reorient the features relative to the major dimension of the rectangular aperture. The resulting treatment profile is symmetrical about the sides of the features oriented toward the major dimension of the rectangular aperture.

Probable Assignee: VEECO INSTRUMENTS INC

Earliest Publication Date: 20050217



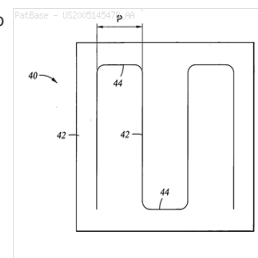
28) Family number: 32061442 (US2005145478A)

TWO DIMENSIONAL MAGNETRON SCANNING FOR FLAT PANEL SPUTTERING

Abstract: Source: US2005145478A A generally rectangular magnetron placed at the back of a rectangular target to intensify the plasma in a sputter reactor configured for sputtering target material onto a rectangular panel. The magnetron has a size only somewhat less than that of the target and is scanned in the two perpendicular directions of the target with a scan length of, for example, about 100 mm for a 2 m target. The scan may follow a double-Z pattern along two links parallel to a target side and the two connecting diagonals. The magnetron includes a closed plasma loop formed in a convolute shape, for example, serpentine or rectangularized helix with an inner pole of nearly constant width extending along a single path and having one magnetic polarity completely surrounded by an outer pole having the opposed polarity.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20050707



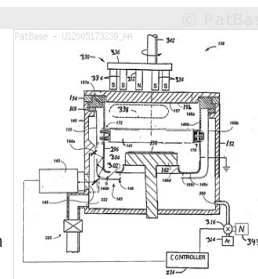
29) Family number: 32136806 (US2005173239A)

END POINT DETECTION FOR SPUTTERING AND RESPUTTERING

Abstract: Source: US2005173239A Plasma etching or resputtering of a layer of sputtered materials including opaque metal conductor materials may be controlled in a sputter reactor system. In one embodiment, resputtering of a sputter deposited layer is performed after material has been sputtered deposited and while additional material is being sputter deposited onto a substrate. A path positioned within a chamber of the system directs light or other radiation emitted by the plasma to a chamber window or other optical view-port which is protected by a shield against deposition by the conductor material. In one embodiment, the radiation path is folded to reflect plasma light around the chamber shield and through the window to a detector positioned outside the chamber window. Although deposition material may be deposited onto portions of the folded radiation path, in many applications, the deposition material will be sufficiently reflective to permit the emission spectra to be detected by a spectrometer or other suitable detector without significant signal loss. The etching or resputtering may be terminated when the detector detects that an underlying layer has been reached or when some other suitable process point has been reached.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20050811



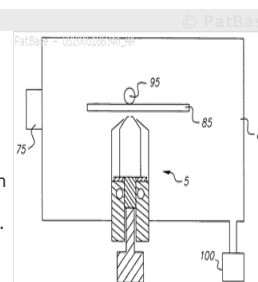
30) Family number: 32192916 (US2005186340A)

DEVICE AND METHOD FOR VAPORIZING TEMPERATURE SENSITIVE MATERIALS

Abstract: Source: US2005186340A A method for vaporizing organic materials onto a substrate surface to form a film including providing a quantity of organic material into a vaporization apparatus and actively maintaining the organic material in a first heating region in the vaporization apparatus to be below the vaporization temperature. The method also includes heating a second heating region of the vaporization apparatus above the vaporization temperature of the organic material and metering, at a controlled rate, organic material from the first heating region into the second heating region so that a thin cross section of the organic material is heated at a desired rate-dependent vaporization temperature, whereby organic material vaporizes and forms a film on the substrate surface.

Probable Assignee: GLOBAL OLED TECHNOLOGY LLC

Earliest Publication Date: 20050825



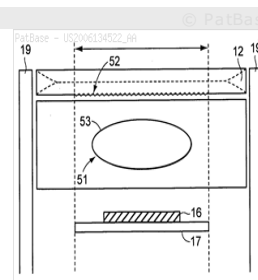
31) Family number: 33078743 (US2006134522A)

DEPOSITION OF LICOO2

Abstract: Source: US2006134522A In accordance with the present invention, deposition of LiCoO_2 layers in a pulsed-dc physical vapor deposition process is presented. Such a deposition can provide a low-temperature, high deposition rate deposition of a crystalline layer of LiCoO_2 with a desired $\langle 101 \rangle$ or $\langle 003 \rangle$ orientation. Some embodiments of the deposition addresses the need for high rate deposition of LiCoO_2 films, which can be utilized as the cathode layer in a solid state rechargeable Li battery. Embodiments of the process according to the present invention can eliminate the high temperature (>700 degrees centigrade) anneal step that is conventionally needed to crystallize the LiCoO_2 layer. Some embodiments of the process can improve a battery utilizing the LiCoO_2 layer by utilizing a rapid thermal anneal process with short ramp rates.

Probable Assignee: SAPURAST RESEARCH LLC

Earliest Publication Date: 20060615



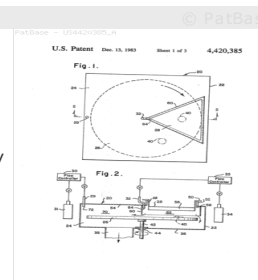
32) Family number: 3882380 (US4420385A)

APPARATUS AND PROCESS FOR SPUTTER DEPOSITION OF REACTED THIN FILMS

Abstract: Source: US4420385A A method and apparatus for forming a thin film on a substrate by sputtering of a material from a cathode, which material is subsequently reacted to form the thin film. A process chamber has a sputter zone which contains a sputter electrode assembly and in which an inert sputtering atmosphere is injected. Isolation means separates the sputtering zone from a reaction zone of the process chamber, into which a chemically reactive atmosphere is injected, and prevents the chemically reactive atmosphere from entering the sputtering zone. A substrate receives a sputtered material in the sputtering zone, and is subsequently transferred to the reaction zone where the sputtered material is contacted by and reacts with the chemically reactive atmosphere therein to form a reacted thin film.

Probable Assignee: PNC BANK NATIONAL ASSOCIATION AGENT AS

Earliest Publication Date: 19831213



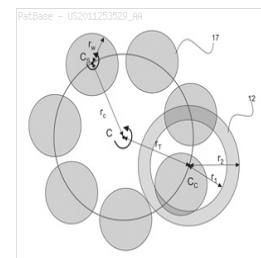
33) Family number: 49768862 (US2011253529A)

RING CATHODE FOR USE IN A MAGNETRON SPUTTERING DEVICE

Abstract: Source: US2011253529A The present invention relates to a magnetron sputtering device including a large ring cathode having a defined inner radius. The position of the ring cathode is offset in relation to a center point of a planetary drive system. An anode or reactive gas source may be located within the inner radius of the ring cathode. Lower defect rates are obtained through the lower power density at the cathode which suppresses arcing, while runoff is minimized by the cathode to planet geometry without the use of a mask.

Probable Assignee: VIAVI SOLUTIONS INC

Earliest Publication Date: 20111019



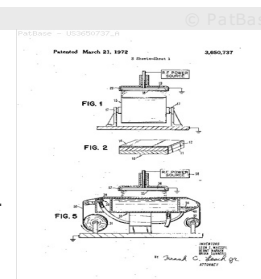
34) Family number: 87066 (US3650737A)

IMAGING METHOD USING PHOTOCONDUCTIVE ELEMENT HAVING A PROTECTIVE COATING

Abstract: Source: US3650737A A transparent, protective coating overlies a photoconductive layer and is integral therewith. The coating, which has a resistivity at least equal to the dark resistivity of the photoconductive material, has a thickness in the range of 50A-4000A. The coating is deposited on the photoconductive layer by sputtering through utilization of a high frequency alternating voltage whereby the properties of the coating may be controlled. When applying the high frequency alternating voltage, the power is kept low to produce a relatively high compressive stress of the coating. Controlling the power results in controlling the compressive stress of the coating. The temperature of the photoconductive layer may be maintained at a sufficiently low temperature so that the photoconductive layer retains its photoconductive properties.

Probable Assignee: IBM

Earliest Publication Date: 19690701



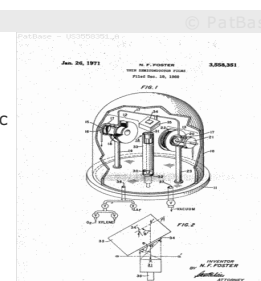
35) Family number: 940227 (US3558351A)

THIN SEMICONDUCTOR FILMS

Abstract: Source: US3558351A ABSTRACT OF THE DISCLOSURE The specification describes a method for depositing thin films of piezoelectric materials in which the crystallographic orientation is controlled by adding a hydrocarbon to the vacuum chamber when initiating deposition and by controlling the angle at which the depositing ions, atoms or molecules meet the substrate. By this method highly oriented films of zinc oxide, adapted for piezoelectric operation in the shear mode, can be produced.

Probable Assignee: BELL TELEPHONE LABOR INC

Earliest Publication Date: 19710126



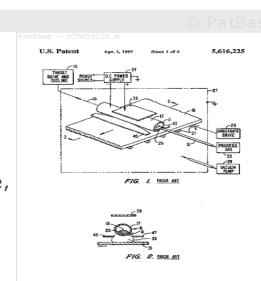
36) Family number: 10670786 (US5616225A)

USE OF MULTIPLE ANODES IN A MAGNETRON FOR IMPROVING THE UNIFORMITY OF ITS PLASMA

Abstract: Source: US5616225A In one group of embodiments, two or more small anodes are spaced apart from one another in a magnetron, with some aspect of their electrical power being individually controlled in a manner to control a density profile across a plasma. In another group of embodiments, the same effect is obtained by mechanically moving one or more small anodes or anode masks. When used in a magnetron having either a rotating cylindrical cathode or a stationary planar cathode and designed to sputter films of material onto a substrate, the uniformity of the rate of deposition across the substrate is improved. Also, adverse effects of sputtering dielectric materials are reduced.

Probable Assignee: VON ARDENNE ANLAGENTECHNIK GMBH

Earliest Publication Date: 19950924



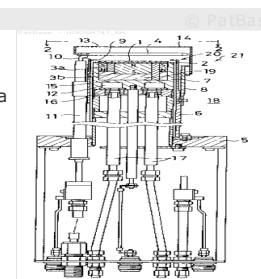
37) Family number: 10789108 (US6254747B)

MAGNETRON SPUTTERING SOURCE ENCLOSED BY A MIRROR-FINISHED METALLIC COVER

Abstract: Source: US6254747B A sputtering apparatus has a permanent magnet for forming, in front of a target, a magnetic field for magnetron discharging. The permanent magnet is disposed behind the target and an RF induction discharge coil is disposed in front of the target. The permanent magnet is contained inside an evacuated cathode case which is in the form of a container and which is provided therein with a circulation passage for cooling water. The cathode case and the RF induction discharge coil are enclosed therearound by a metallic cover which has an aperture for emitting sputtered particles. To make an element for a magnetoresistance head, a substrate is transferred from a load lock chamber to a pre-treatment chamber to clean it therein by an etching apparatus. The substrate is then transferred to an ultrahigh vacuum film deposition chamber which is provided therein with a plurality of inductively coupled RF plasma-assisted magnetron sputtering apparatuses which are evacuated to an ultrahigh vacuum. Extremely thin multiple layers of flat non-magnetic layers and magnetic layers are alternately deposited therein on the substrate. The deposition is controlled by opening and closing a shutter which is disposed in a position to prevent splashing of the sputtered particles to the substrate. The substrate is moved to a position of respective sputtering apparatuses inside the film deposition chamber to deposit different kinds of films.

Probable Assignee: NIHON SHINKU GIJUTSU KK

Earliest Publication Date: 19980714



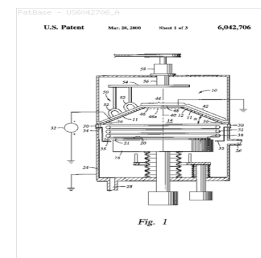
38) Family number: 10989361 (US6042706A)

IONIZED PVD SOURCE TO PRODUCE UNIFORM LOW-PARTICLE DEPOSITION

Abstract: Source: US6042706A The present invention generally provides a target structure that allows uniform erosion and efficient utilization of a sputterable material while reducing particle generation caused by backscatter deposition. The target has an annular region comprised of sputterable material and a central region configured to receive direct deposition rather than backscatter deposition. The annular region of the target provides an exposed surface that is generally concave, but is preferably substantially frustoconical. The central region of the target provides an exposed surface having a configuration that is either substantially planar or convex, but is preferably substantially convex frustoconical.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19980715



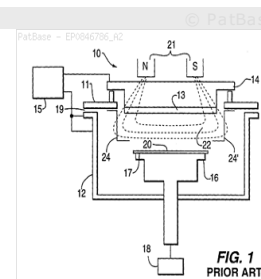
39) Family number: 11012698 (EP0846786A2)

MODIFIED PHYSICAL VAPOR DEPOSITION CHAMBER AND METHOD OF DEPOSITING MATERIALS AT LOW PRESSURE

Abstract: Source: EP0846786A2 A conventional sputtering chamber (100) is modified by providing a target extension (102) that surrounds the plasma region (110) and confines electrons to the plasma. This enhancement of confinement of the plasma reduces the pressure needed to maintain the plasma. At low pressures, reduced scattering of sputtered species takes place and more sputtered particles arrive vertically at the substrate (108), improving the filling of high aspect ratio openings in the substrate.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19980610



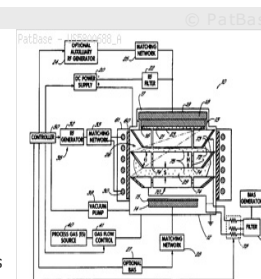
40) Family number: 11248503 (US5800688A)

APPARATUS FOR IONIZED SPUTTERING

Abstract: Source: US5800688A An ionized physical vapor deposition apparatus is provided with a helical RF coil that surrounds the chamber wall opposite a space between a target and a substrate holder. The coil is behind a quartz window in the wall of the chamber, which protects the coil from adverse interaction with plasma. The coil is energized with RF energy, preferably in the 0.1 to 60 MHz range, to form a secondary plasma in a volume of the space between the substrate holder and the main plasma that is adjacent the target. A shield between the space and the dielectric material prevents coating from forming on the window. The shield is formed of a plurality of angled sections that are spaced to facilitate communication of a secondary RF plasma from adjacent the window to the volume of the chamber where the sputtered material is ionized, with the sections angled and spaced to shadow at least most of the target from the window. In one embodiment, a plurality of axially spaced frusto-conical sections are used, with axial gaps to interrupt current eddy paths around the chamber. In another embodiment, the sections are in the form of a plurality angled axially extending circumferentially spaced blades. The shields may be commonly or separately biased to control contamination and to optimize the uniformity of coating on the substrate and the directionality of the flux of ionized material at the substrate.

Probable Assignee: TOKYO ELECTRON LTD

Earliest Publication Date: 19980901



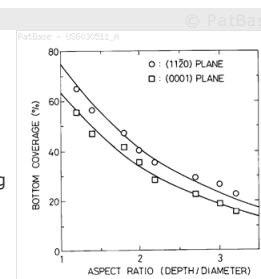
41) Family number: 12092458 (US6030511A)

COLLIMATED SPUTTERING METHOD AND SYSTEM USED THEREFOR

Abstract: Source: US6030511A A collimated sputtering method that enables to improve the deposition rate per applied unit power and the bottom coverage is provided. This method contains a step of controlling a condition of a glow discharge in a chamber to increase a rate of a sputtered species that is contained in a specified angle range and that passes through a collimator. The rate of the sputtered species that can pass through the collimator is increased. Also, the rate of the passed species travelling parallel to the normal direction is increased. The sputtering surface of the target contains a crystal plane that is approximately perpendicular to a crystal axis having a shortest interatomic distance.

Probable Assignee: NIPPON DENKI KK

Earliest Publication Date: 19960813



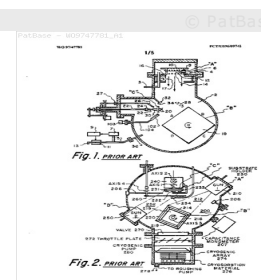
42) Family number: 12510913 (WO9747781A1)

REACTIVE MAGNETRON SPUTTERING APPARATUS AND METHOD

Abstract: A method and apparatus for producing optical films on substrates having extremely high packing densities of the same quality as those films produced by ion beam sputtering including a vacuum chamber with a conventional magnetron sputtering system and unusually high speed vacuum pump means. The low pressure of inert gas created by said high speed vacuum pump means being in the range of 5×10^{-5} Torr to 2.0×10^{-4} Torr and the magnetron sputtering system being at least 20" from said substrates. A gas manifold around the magnetron and target material confines the inert working gas in the vicinity of the magnetron and as the gas diffuses and expands into the chamber the high speed vacuum pump means removes the expanded gas from the chamber at the high speed. An ion gun directs ionized reactant gas toward the substrates which has the effect of improving film stoichiometry as well as reducing reactant gas at the magnetron. Multiple magnetron assemblies, multiple target materials and compound target materials may be used.

Probable Assignee: CORNING OCA CORP

Earliest Publication Date: 19971218



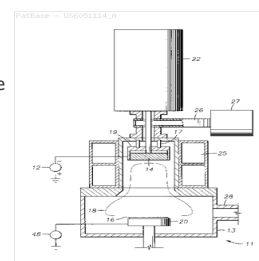
43) Family number: 13353831 (US6051114A)

USE OF PULSED-DC WAFER BIAS FOR FILLING VIAS/TRENCHES WITH METAL IN HDP PHYSICAL VAPOR DEPOSITION

Abstract: Source: US6051114A The present invention provides a method and apparatus for preferential PVD conductor fill in an integrated circuit structure. The present invention utilizes a high density plasma for sputter deposition of a conductive layer on a patterned substrate, and a pulsed DC power source capacitively coupled to the substrate to generate an ion current at the surface of the substrate. The ion current prevents sticking of the deposited material to the field areas of the patterned substrate, or etches deposited material from the field areas to eliminate crowning or cusping problems associated with deposition of a conductive material in a trench, hole or via formed on the substrate.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19981230



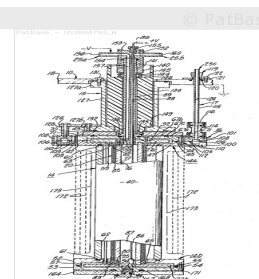
44) Family number: 1357399 (US3884793A)

ELECTRODE TYPE GLOW DISCHARGE APPARATUS

Abstract: Source: US3884793A This is disclosed herein an electrode type glow discharge apparatus, such as that used for sputtering material from a cathode to provide a coating or the like on materials such as a substrate or substrates. Several exemplary embodiments are disclosed involving various combinations of structural features including a flanged or spool type cathode, anode placement with respect thereto, provision of internal and/or external magnetic fields with field lines close to and substantially parallel with the barrel of the cathode, insulator placement, efficient cooling for anode and cathode, and the like. Furthermore, the assembly is constructed in a manner such that the same can be readily disassembled for enabling change of cathode materials and for cleaning cooling fluid passageways of the cathode and anode. Embodiments are described wherein at least a portion of the cathode may be in the form of a continuously moving member, such as a wire. The various structural features enable apparatus to be provided which can create stable and uniform plasmas confined and controlled volume while operating at relatively low pressures with relatively low operating voltages. "96 -A 45 Claims, 10 Drawing Figures

Probable Assignee: TELIC CORP

Earliest Publication Date: 19730309



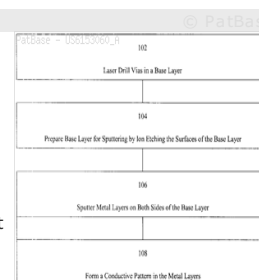
45) Family number: 15766368 (US6153060A)

SPUTTERING PROCESS

Abstract: Source: US6153060A A method for coating substrates having sides of the substrate with unequal adhesion properties includes the steps of non-symmetrically coating the substrate by coating a first side under a first set of coating conditions and coating a second side under a second set of operating conditions wherein the operating conditions used to coat each side are varied so as to compensate for the unequal adhesion properties of the sides. Also, a method for substrate preparation comprising the steps of: providing an annealed thermoplastic substrate base layer having a first surface and a second surface; stabilizing the substrate base layer in an environment having a baseline temperature and relative humidity; drilling vias in the base layer; subjecting the first and second surfaces of the base layer to ion processing so as to remove contaminants caused by drilling the vias and to prepare the first and second surfaces for sputtering; metalizing the base layer by first sputtering at least one metal layer onto the first surface of the base layer and subsequently sputtering at least one metal layer onto the second surface of the base layer said sputtering of the metal layers being controlled so as to prevent the temperature of the base layer from exceeding the annealing temperature of the base layer; allowing the metalized base layer to stabilize in an environment having the baseline temperature and relative humidity and then subjecting the metalized base layer to further processing so as to modify the metal layers into conductive patterns.

Probable Assignee: HONEYWELL INT INC

Earliest Publication Date: 20001128



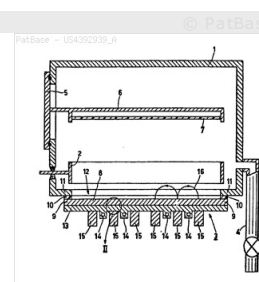
46) Family number: 2026933 (US4392939A)

MAGNETRON CATHODE SPUTTERING SYSTEM

Abstract: Source: US4392939A In a magnetron cathode sputtering system the target (plate of material to be sputtered) 8 is held against a backing plate 13 by a vacuum, enabling the backing plate 13 to be reused. By providing the backing plate with a layer of soldering material which adheres to the backing plate 13, but does not adhere to the target 8, heat transfer between the two plates is improved.

Probable Assignee: PHILIPS NV

Earliest Publication Date: 19830712



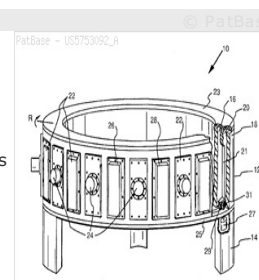
47) Family number: 20659962 (US5753092A)

CYLINDRICAL CARRIAGE SPUTTERING SYSTEM

Abstract: Source: US5753092A A sputtering system comprising three concentric cylinders. The inner and outer cylinders, along with top and bottom sealing flanges, form an annular chamber with cylindrical walls. A central cylinder, disposed between the inner and outer cylinders, includes substrate-carrying openings and serves as a cylindrical carriage which substantially fills the annular chamber passageway and is rotatable in predetermined steps relative to the chamber. Substrate processing devices for deposition, etching, heating, and cooling arc attached around the circumference of the inner and/or outer cylinders. Vacuum pumps are located between substrate processing devices. The openings in the cylindrical carriage are each fitted with a substrate holder for supporting a multiplicity of substrates. Entrance and exit vacuum load-locks are provided for transferring substrates into and out of the system. The system is designed for substrate processing temperatures of 1000 DEG C. and above.\

Probable Assignee: HANERGY HOLDING GROUP LTD

Earliest Publication Date: 19980305



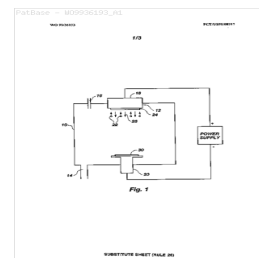
48) Family number: 20750079 (WO9936193A1)

METHOD AND APPARATUS FOR PROVIDING A CONDUCTIVE, AMORPHOUS NON-STICK COATING

Abstract: A conductive, non-stick coating (62) is provided using a ceramic material which is conductive, flexible and provides a surface which exhibits the property of lubricity. A room or near room temperature manufacturing process produces a coating of titanium nitride on a substrate, where the coating is amorphous if the substrate is a solid material including plastics, composites, metals, magnets and ceramics, enabling the substrate to bend without damaging the coating. The coating can also be applied as a conformal coating on a variety of substrate shapes, depending upon the application. The coating is biocompatible and can be applied to a variety of medical devices.

Probable Assignee: MEDQUEST PRODUCTS INC

Earliest Publication Date: 19990722



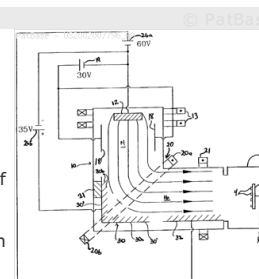
49) Family number: 28166703 (US2002007796A)

FILTERED CATHODIC ARC DEPOSITION METHOD AND APPARATUS

Abstract: Source: US2002007796A An apparatus for the application of coatings in a vacuum comprising a plasma duct surrounded by a magnetic deflecting system communicating with a first plasma source and a coating chamber in which a substrate holder is arranged off of an optical axis of the plasma source, has at least one deflecting electrode mounted on one or more walls of the plasma duct. In one embodiment an isolated repelling or repelling electrode is positioned in the plasma duct downstream of the deflecting electrode where the tangential component of a deflecting magnetic field is strongest, connected to the positive pole of a current source which allows the isolated electrode current to be varied independently and increased above the level of the anode current. The deflecting electrode may serve as a getter pump to improve pumping efficiency and divert metal ions from the plasma flow. In a further embodiment a second arc source is activated to coat the substrates while a first arc source is activated, and the magnetic deflecting system for the first arc source is deactivated to confine plasma to the cathode chamber but permit electrons to flow into the coating chamber for plasma immersed treatment of the substrates. A load lock shutter may be provided between the plasma duct and the coating chamber further confine the plasma from the first arc source.

Probable Assignee: G AND H TECHNOLOGIES LLC

Earliest Publication Date: 20011010



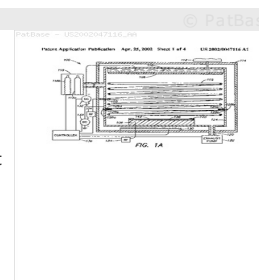
50) Family number: 28182432 (US2002047116A)

COIL FOR SPUTTER DEPOSITION

Abstract: Source: US2002047116A Coils for use within high density plasma chambers are provided that do not electrically disconnect or short circuit following repeated depositions and that produce films having reduced in-film defect densities. To reduce in-film defect densities, dielectric inclusion content, porosity, grain size and surface roughness of a coil are reduced, while the mechanical strength of the coil is increased so as to both decrease defect generation and thermal creep rate (e.g., to prevent electrical disconnection or short circuiting of the coil following repeated depositions).

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19990603



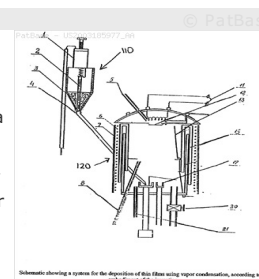
51) Family number: 29114165 (US2003185977A)

METHODS AND APPARATUS FOR DEPOSITION OF THIN FILMS

Abstract: Source: US2003185977A A method for depositing a thin film includes the steps of providing a vapor including at least one selected vapor phase component into an evacuated chamber and condensing the vapor onto a heated substrate to form a liquid phase deposit wherein a temperature of the substrate is lower than the condensation temperature of the component. The liquid deposit is then cooled to produce a solid phase film. The invention can provide two or more vapor phase components. The invention can be used to deposit a wide variety of layers, including thin films of metallic, semiconductor and nonmetallic inorganic materials. The invention is useful for forming solid electrolytes and the electrodes for batteries, fuel cells and other electromagnetically active devices.

Probable Assignee: ENMAT GLOBAL LLC

Earliest Publication Date: 20031002



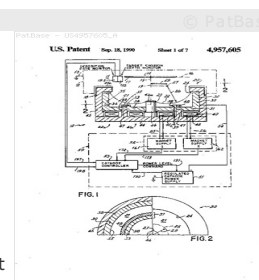
52) Family number: 29244099 (US4957605A)

METHOD AND APPARATUS FOR SPUTTER COATING STEPPED WAFERS

Abstract: Source: US4957605A A magnetron sputtering method and apparatus employing a one-piece annular target having a concave continuously smooth surface with an inwardly facing portion close to and surrounding the outer edge of a stepped wafer provides a sputtering surface with areas facing the differently facing surfaces of the wafer steps. Two concentric erosion zones on the target surface are independently energized at different electrical parameter values by synchronizing the power applied to the single target with switched activation of plasmas overlying the respective target regions which define the erosion zones. The electrical parameters and the geometry are established so as to uniformly coat the differently facing surfaces of the stepped wafer. During part of the duty cycle during which each target region is energized, parameters may be measured. Such parameters may be those which vary with changes in geometry as for example may be due to target erosion. The operation of different target regions, such as the duty cycles or power levels for such regions, may be separately varied in response to the measurements or otherwise, to maintain uniform substrate coating as the target erodes. The target is thicker under the outer region and has an annular pole piece embedded to reduce the space separating the target erosion regions, and includes means to cool the target and reinforce it against thermal expansion.

Probable Assignee: TOKYO ELECTRON LTD

Earliest Publication Date: 19900918



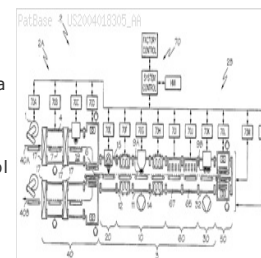
53) Family number: 29430746 (US2004018305A)

APPARATUS FOR DEPOSITING A MULTILAYER COATING ON DISCRETE SHEETS

Abstract: Source: US2004018305A A tool for depositing multilayer coatings onto a substrate. The tool includes a housing defining a vacuum chamber connected to a vacuum source, deposition stations each configured to deposit a layer of multilayer coating on the substrate, a curing station, and a contamination reduction device. At least one of the deposition stations is configured to deposit an inorganic layer, while at least one other deposition station is configured to deposit an organic layer. In one tool configuration, the substrate may travel back and forth through the tool as many times as needed to achieve the desired number of layers of multilayer coating. In another, the tool may include numerous housings adjacently spaced such that the substrate may make a single unidirectional pass. The contamination reduction device may be configured as one or more migration control chambers about at least one of the deposition stations, and further includes cooling devices, such as chillers, to reduce the presence of vaporous layer precursors. The tool is particularly well-suited to depositing multilayer coatings onto flexible substrates, as well as to encapsulating environmentally-sensitive devices placed on the flexible substrate.

Probable Assignee: SAMSUNG DISPLAY CO LTD

Earliest Publication Date: 20031030



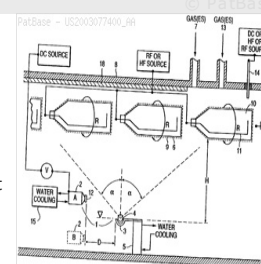
54) Family number: 29583139 (US2003077400A)

METHOD FOR COATING A PLASTIC CONTAINER WITH VACUM VAPOR DEPOSITION

Abstract: Source: US2003077400A A method, composition and system for coating an external surface of containers and in particular, plastic containers, provides for low permeability to gases and vapors. The coating applied to the external surface of the containers is very thin and is comprised of one or several inorganic substances or layers of substances. For example, the coating can include silica which is bonded to the external surface of the container. This coating will be flexible and can be applied regardless of the container's internal pressure or lack thereof. The coating will firmly adhere to the container and possess an enhanced gas barrier effect after pressurization even when the coating is scratched, fractured, flexed and/or stretched. Moreover, this gas barrier enhancement will be substantially unaffected by filling of the container.

Probable Assignee: COCA COLA CO

Earliest Publication Date: 19980917



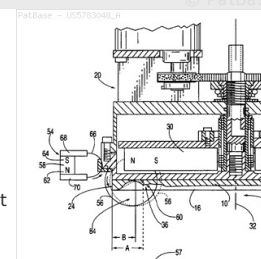
55) Family number: 29744016 (US5783048A)

SPUTTERING CATHODE WITH UNIFORMITY COMPENSATION

Abstract: Source: US5783048A A sputtering apparatus for forming a thin film on a substrate is disclosed. The sputtering apparatus includes a target for providing target material for forming the thin film, wherein the target includes a first area. The sputtering apparatus further includes a plasma discharge to enable removal of target material from the target. In addition, a main magnet is provided for generating a main magnetic field for controlling the plasma discharge to remove the target material. Further, a compensating magnet is utilized which is positioned adjacent to the first area. The compensating magnet generates a compensating magnetic field which interacts with the main magnetic field to control the plasma discharge in the first area to form a desired erosion pattern in the first area and enable formation of a substantially uniform film thickness on the substrate.

Probable Assignee: TOKYO ELECTRON LTD

Earliest Publication Date: 19960924



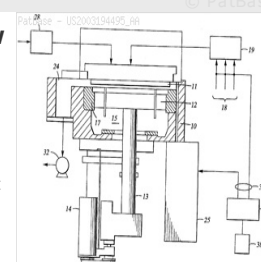
56) Family number: 29908761 (US2003194495A)

CROSSLINK CYCLO-SILOXANE COMPOUND WITH LINEAR BRIDGING GROUP TO FORM ULTRA LOW K DIELECTRIC

Abstract: Source: US2003194495A A method for depositing a low dielectric constant film having a dielectric constant of about 3.0 or less, preferably about 2.5 or less, is provided by using one or more cyclic organic precursors and one or more aliphatic precursors. In one aspect, a cyclic organosilicon compound, an aliphatic organosilicon, and an aliphatic hydrocarbon compound are reacted with an oxidizing gas at conditions sufficient to deposit a low dielectric constant film on the semiconductor substrate. The cyclic organosilicon compound includes at least one silicon-carbon bond. The aliphatic organosilicon compound includes a silicon-hydrogen bond or a silicon-oxygen bond.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20031016



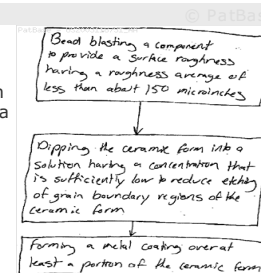
57) Family number: 30005321 (US2003118731A)

METHOD OF FABRICATING A COATED PROCESS CHAMBER COMPONENT

Abstract: Source: US2003118731A A method of fabricating a process chamber component that has a ceramic form with grains and grain boundary regions. In the method, the component is bead blasted to provide a surface having a relatively low roughness average of less than about 150 microinches. The component is dipped into a solution having a concentration that is sufficiently low to reduce etching of grain boundary regions of the ceramic form. A metal coating is formed over at least a portion of the ceramic form. The component fabricated by this method can tolerate thicker deposits of sputtered material in a sputtering process without the sputtered deposit accumulates causing spalling of the coating of the component.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20030626



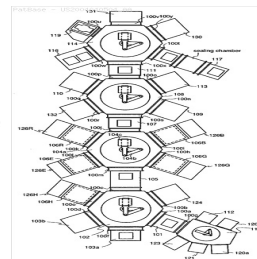
58) Family number: 30347971 (US2004040504A)

MANUFACTURING APPARATUS

Abstract: Source: US2004040504A The present invention provides an evaporation apparatus, which is one type of film formation apparatus and provides superior uniformity in EL layer film thickness, superior throughput, and improved utilization efficiency of EL materials and an evaporation method. The present invention is characterized in that an evaporation source holder, in which a container that encloses an evaporation material is disposed, is moved at a certain pitch with respect to a substrate during evaporation. Further, a film thickness monitor is integrated with the evaporation source holder for the movement. Furthermore, film thickness can be made uniform by adjusting the moving speed of the evaporation source holder in accordance with values measured by the film thickness monitor.

Probable Assignee: SEMICONDUCTOR ENERGY LAB CO LTD

Earliest Publication Date: 20040211



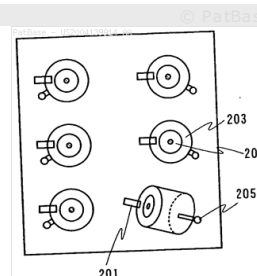
59) Family number: 30457406 (US2004139914A)

FABRICATION SYSTEM, LIGHT-EMITTING DEVICE AND FABRICATING METHOD OF ORGANIC COMPOUND-CONTAINING LAYER

Abstract: Source: US2004139914A The present invention provides a vapor deposition system for a film forming systems that promote an efficiency of utilizing an EL material and is excellent in uniformity or throughput of forming an EL layer and a vapor deposition method. According to the present invention, vapor deposition is carried out in a deposition chamber by moving an evaporation source holder 903 on which six containers 911 filled with an evaporation material are set at a certain pitch with respect to the substrate. The evaporation holder 903 is transported from an installation chamber 905 by a transport mechanism 902b. A heater is provided in a turntable 907. Throughput can be improved by heating the evaporation holder 903 in advance of transporting containers into the evaporation holder 903.

Probable Assignee: SEMICONDUCTOR ENERGY LAB CO LTD

Earliest Publication Date: 20040408



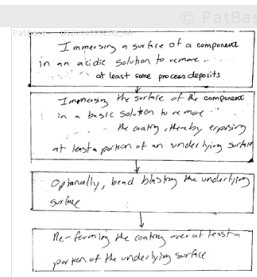
60) Family number: 30587682 (US2004099285A)

METHOD OF CLEANING A COATED PROCESS CHAMBER COMPONENT

Abstract: Source: US2004099285A In a method of cleaning and refurbishing a process chamber component having a metal coating having a surface thereon, the surface of the metal coating is immersed in an acidic solution to remove at least a portion of the process deposits from the surface. Thereafter, the surface of the metal coating is immersed in a basic solution to remove substantially all the metal coating. The component may optionally be bead blasting to roughen a surface of the component, and the metal coating may be reformed.

Probable Assignee: QUANTUM GLOBAL TECHNOLOGIES LLC

Earliest Publication Date: 20040527



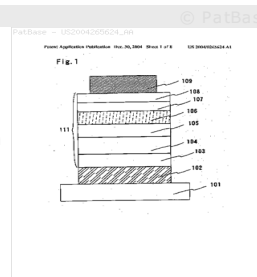
61) Family number: 30717982 (US2004265624A)

ORGANIC LIGHTING EMITTING ELEMENT, ORGANIC LIGHTING EMITTING DEVICE HAVING THE ORGANIC LIGHTING EMITTING ELEMENT, AND ELECTRONIC APPLIANCE HAVING THE ORGANIC LIGHTING EMITTING DEVICE

Abstract: Source: US2004265624A An organic light-emitting device is manufactured, which is formed laminating an electroluminescent layer (111) including an electroluminescent organic compound and a cathode (109) sequentially on anode (101). The electroluminescent layer (111) has a hole blocking layer (106), and this hole blocking layer (106) is formed of two or more kinds of materials. It is possible to manufacture a high-efficiency and high-reliability organic light-emitting device by introducing the hole blocking layer like this.

Probable Assignee: SEMICONDUCTOR ENERGY LAB CO LTD

Earliest Publication Date: 20040624



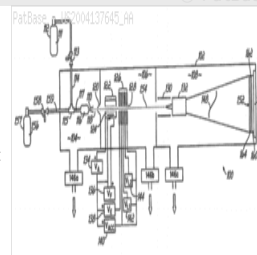
62) Family number: 30726475 (US2004137645A)

METHOD OF FORMING THIN OXIDATION LAYER BY CLUSTER ION BEAM

Abstract: Source: US2004137645A A method of forming a thin-film magnetic element, such as a TMR element or a spin valve element, on a substrate wherein at least a surface portion of a nonmagnetic metal layer is oxidized by cluster ion beam (CIB) oxidation. Specifically, the method comprises depositing a first magnetic layer on a substrate, then depositing a nonmagnetic metal layer on the first magnetic layer. At least a top surface of the nonmagnetic layer is oxidized by CIB oxidation. In one embodiment, only a top surface portion is oxidized such that a nano-oxide layer (NOL) is formed on a nonmagnetic conductive layer. In another embodiment, the nonmagnetic metal layer is oxidized throughout its thickness such that the layer is converted to a nonmagnetic insulating film. After oxidation, a second magnetic layer is deposited on the oxidized layer. Oxidizing by cluster ion beam oxidation advantageously comprises mixing a pressurized inert carrier gas with oxygen gas to form a gas mixture and passing the gas mixture into a low pressure vacuum to produce a supersonic gas jet, whereby expansion occurs in the jet to cause formation of clusters of inert gas and oxygen atoms and molecules. The clusters are then ionized and focused into a cluster ion beam and accelerated toward the top surface of the nonmagnetic metal layer to bombard the top surface and react the ionized oxygen atoms and molecules with at least the top surface of the nonmagnetic metal layer.

Probable Assignee: VEECO INSTRUMENTS INC

Earliest Publication Date: 20040715



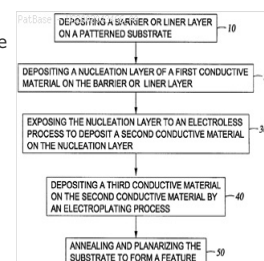
63) Family number: 31019329 (US2002043466A)

METHOD AND APPARATUS FOR PATCHING ELECTROCHEMICALLY DEPOSITED LAYERS USING ELECTROLESS DEPOSITED MATERIALS

Abstract: Source: US2002043466A Methods and apparatus for forming a conformal conductive layer on a substrate for an electroplating process are provided. In one aspect, a method is provided for processing a substrate including depositing a conductive barrier layer on the substrate, and then depositing a nucleation layer on the conductive barrier layer. The nucleation layer is deposited by depositing a first conductive material on the substrate and then depositing a second conductive material on the first conductive material by an electroless deposition process. The second conductive material may comprise nickel, tin, or combinations thereof. The substrate may then be further processed by electroplating a third conductive material on the second conductive material and/or annealing the substrate.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20010110



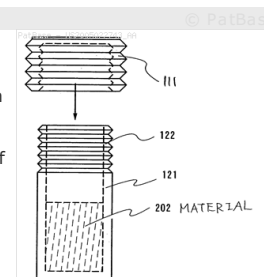
64) Family number: 31495077 (US2005022743A)

EVAPORATION CONTAINER AND VAPOR DEPOSITION APPARATUS

Abstract: Source: US2005022743A To provide an evaporation container and a vapor deposition apparatus in which vapor deposition can be performed stably with use of an evaporation container formed of an inexpensive material being easily processed without clogging the material. The side surface of a lid for the evaporation container is provided with an accordion-shaped structure. The lid of the evaporation container is made larger than an opening of an evaporation source such that the lid is directly contacted to a heating portion. According to the structure, the periphery of the opening for the lid is not easily cooled down; and therefore the variation in temperature between the body and the lid of the container is hardly generated. Consequently, an evaporated material hardly clog at the opening, vapor deposition can be stably performed for a long time, thereby increasing productivity.

Probable Assignee: SEMICONDUCTOR ENERGY LAB CO LTD

Earliest Publication Date: 20050203



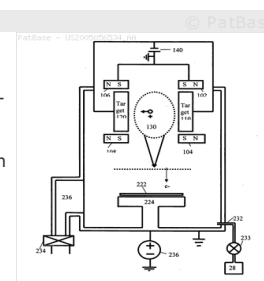
65) Family number: 31760431 (US2005056534A)

BACK-BIASED FACE TARGET SPUTTERING

Abstract: Source: US2005056534A A facing targets sputtering device for semiconductor fabrication includes an air-tight chamber in which an inert gas is admittable and exhaustible; a pair of target plates placed at opposite ends of said air-tight chamber respectively so as to face each other and form a plasma region therebetween; a pair of magnets respectively disposed adjacent to said target plates such that magnet poles of different polarities face each other across said plasma region thereby to establish a magnetic field of said plasma region between said target plates; a substrate holder disposed adjacent to said plasma region, said substrate holder adapted to hold a substrate on which an alloyed thin film is to be deposited; and a back-bias power supply coupled to the substrate holder.

Probable Assignee: 4D S PTY LTD

Earliest Publication Date: 20050317



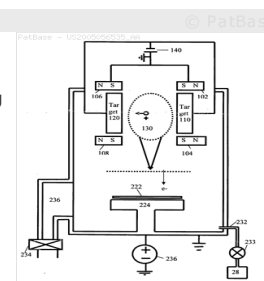
66) Family number: 31760432 (US2005056535A)

APPARATUS FOR LOW TEMPERATURE SEMICONDUCTOR FABRICATION

Abstract: Source: US2005056535A In one aspect, a semiconductor fabrication system includes an air-tight housing in which an inert gas is admittable and exhaustible; and a plurality of deposition chambers positioned within the system.

Probable Assignee: 4D S PTY LTD

Earliest Publication Date: 20050317



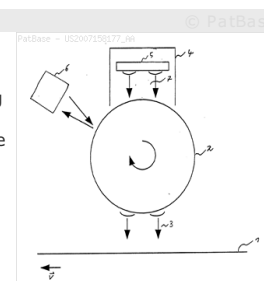
67) Family number: 32027246 (US2007158177A)

METHOD AND DEVICE FOR MAGNETRON SPUTTERING

Abstract: Source: US2007158177A The invention relates to a magnetron coating system, comprising a first coating source, an auxiliary substrate, a magnetron and means for determining the area density of the auxiliary substrate. The auxiliary substrate is thereby arranged between the first coating source and the area that is provided to receive the substrate to be coated, and forms a cathode for the magnetron. The invention further relates to a method for depositing thin layers, in which a layer is deposited on an auxiliary substrate by means of a first coating source and this auxiliary substrate is used as a cathode for coating a substrate by means of a magnetron and the area density of the auxiliary substrate is determined.

Probable Assignee: FRAUNHOFER GES

Earliest Publication Date: 20050630



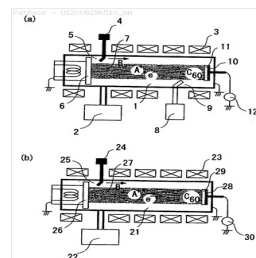
68) Family number: 32091086 (US2008296510A)

ION IMPLANTATION SYSTEM AND ION IMPLANTATION SYSTEM

Abstract: Source: US2008296510A It is devised to transport plasma including charged particles made of containment target atom ions and charged particles of a polarity opposite to that of the containment target atom ions, up to an empty fullerene film on a deposition-assistance substrate by a uniform magnetic field, and to give acceleration energies to the containment target atoms by a bias voltage applied to the deposition-assistance substrate, thereby implanting the containment target atoms into the fullerene film. Since attractive forces act between the charged particles constituting the plasma so that the plasma is not diverged, it becomes possible to achieve a high density ion implantation to improve a yield of containing-fullerene even in ion implantation with a low energy.

Probable Assignee: IDEAL STAR INC

Earliest Publication Date: 20050721



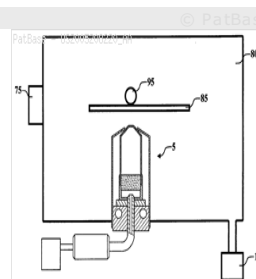
69) Family number: 32255937 (US2005208220A)

VAPORIZING FLUIDIZED ORGANIC MATERIALS

Abstract: Source: US2005208220A A method for vaporizing organic materials onto a surface, to form a film includes providing a quantity of organic material in a fluidized powdered form; metering the powdered organic material and directing a stream of such fluidized powder onto a first member; heating the first member so that as the stream of fluidized powder is vaporized; collecting the vaporized organic material in a manifold; and providing a second member formed with at least one aperture in communication with the manifold that permits the vaporized organic material to be directed onto the surface to form a film.

Probable Assignee: GLOBAL OLED TECHNOLOGY LLC

Earliest Publication Date: 20050922



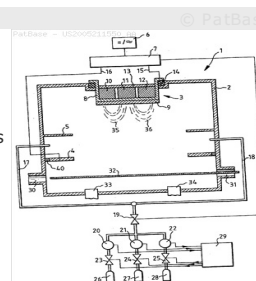
70) Family number: 32271323 (US2005211550A)

DEVICE FOR REACTIVE SPUTTERING

Abstract: Source: US2005211550A A device for reactive sputtering, wherein a cathode is applied a discharge voltage for a plasma, and a working gas and a reactive gas are introduced into a sputter chamber. The total gas flow in the sputter chamber is controlled with the aid of a valve, while the ratio of the partial pressures of both gases is kept constant.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20041021



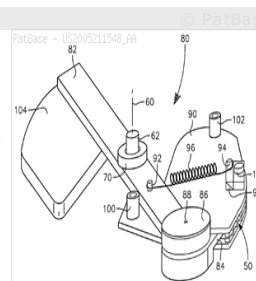
71) Family number: 32274440 (US2005211548A)

SELECTABLE DUAL POSITION MAGNETRON

Abstract: Source: US2005211548A A dual-position magnetron that is rotated about a central axis in back of a sputtering target, particularly for sputtering an edge of a target of a barrier material onto a wafer and cleaning material redeposited at a center of the target. During target cleaning, wafer bias is reduced. In one embodiment, an arc-shaped magnetron is supported on a pivot arm pivoting on the end of a bracket fixed to the rotary shaft. A spring biases the pivot arm such that the magnetron is urged towards and overlies the target center. Centrifugal force at increased rotation rate overcomes the spring bias and shift the magnetron to an outer position with the long magnetron dimension aligned with the target edge. Mechanical stops prevent excessive movement in either direction. Other mechanisms include linear slides and actuators.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20050929



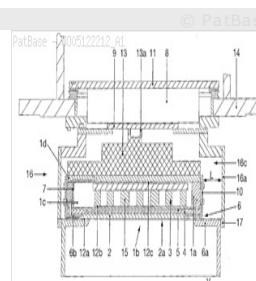
72) Family number: 32504967 (WO05122212A1)

DEVICE AND METHOD FOR ATOMISING WITH THE AID OF A DISPLACEABLE PLANAR TARGET

Abstract: The invention relates to a device for atomising material in a vacuum chamber with the aid of a displaceable target device (1) comprising a planar target (2) which can be switched as a cathode and which can be displaced on a plane. The inventive device comprises a stationary target environment (16), a drive device (8, 9) which is associated with the target device, an anode device (6) comprising at least one anode (6a, 6b) which is associated with the target (2) and a stationary magnet device (3) which is used to produce a magnet field in order to reinforce the removal of material from an atomising surface of the target (2). The inventive device is characterised in that it comprises at least one non-rotational symmetrical target (2) which is embodied, preferably, as a rectangular target plate, and which can be displaced on a plane by means of the target device (1). The invention also relates to a method for atomising material.

Probable Assignee: LEYBOLD OPTICS GMBH

Earliest Publication Date: 20051222

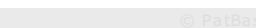


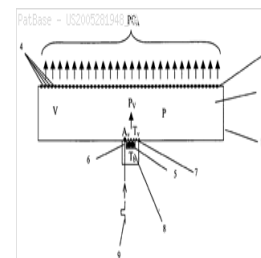
73) Family number: 32508381 (US2005281948A)

VAPORIZING TEMPERATURE SENSITIVE MATERIALS

Abstract: Source: US2005281948A A method for vaporizing material onto a substrate surface to form a film includes providing a quantity of material into a vaporization apparatus, heating the material in the vaporization apparatus at a first temperature condition, and applying a heat pulse which acts on a portion of the material to cause such portion of the material to vaporize and be applied to the substrate surface.

Probable Assignee: GLOBAL OLED TECHNOLOGY LLC





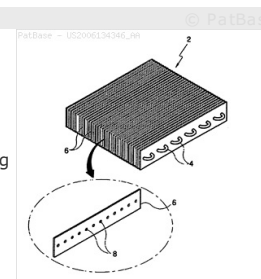
74) Family number: 33164852 (US2006134346A)

METHOD OF MANUFACTURING HEATING/COOLING COIL WITH NANOMETER SILVER COATING LAYER

Abstract: Source: US2006134346A Disclosed herein is a method of manufacturing a heating/cooling coil with a nanometer silver coating layer, in which vacuum deposition of nanometer silver is performed on the surface of a heating/cooling coil, thus preventing corrosion of aluminum, sterilizing heating/cooling gas and fluid, and maintaining high heat conductivity. The method includes feeding argon gas into a vacuum chamber at a pressure of 10^{-5} - 10^{-7} torr until the pressure in the vacuum chamber reaches 100^2 torr, applying high negative voltage (-500~5000 V) to nanometer silver particles serving as a target material so that cations of argon gas induced by glow discharge collide with the surface of the nanometer silver particles electrically charged to a cathode, to eject the nanometer silver particles in the form of atoms in vapor phase, and forming the nanometer silver particles in vapor phase into a nanometer silver coating layer on the surface of the heating/cooling coil. In the current invention, ion sputtering is used to coat the surface of the heating/cooling coil with nanometer silver, thereby effectively increasing corrosion resistance for a long time and further enhancing surface sterilization effects.

Probable Assignee: NEPES CO LTD

Earliest Publication Date: 20050131



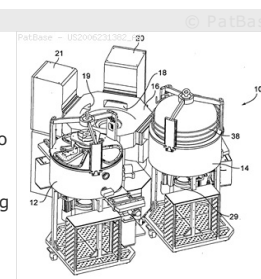
75) Family number: 33511191 (US2006231382A)

ROTATING PALLET IN SPUTTERING SYSTEM

Abstract: Source: US2006231382A A multi-chamber processing system is described for depositing materials on multiple workpieces (wafers, display panels, or any other workpieces) at a time in a vacuum chamber. The system includes a sputtering chamber and a separate pre-clean chamber, where wafers can be transferred between the two chambers by a robotic arm without breaking a vacuum. The wafers are mounted one-by-one onto a rotating pallet in the pre-cleaning chamber and sputtering chamber. The pallet is firmly fixed to a rotatable table in the sputtering chamber. Copper tubing in the table couples RF energy to the wafers, and a liquid running through the copper tubing controls the temperature of the wafers. Multiple targets, of the same or different materials, may concurrently deposit material on the wafers as the pallet is rotating. Multiple magnets (one for each target) in the magnetron assembly in the sputtering chamber oscillate over their respective targets for uniform target erosion and uniform deposition on the wafers. An electrically insulated target backing plate between each magnet and a target has a liquid channel running through it for controlling temperature. The distance between the magnets and the targets is made very small by a thin aluminum plate fixed to the bottom segment of the target backing plate by a dip brazing process. Various shields are described to prevent cross-contamination from the targets and prevent the sputtered target material from entering gaps in the chamber and shorting out insulators.

Probable Assignee: TANGO SYSTEMS INC

Earliest Publication Date: 20061019



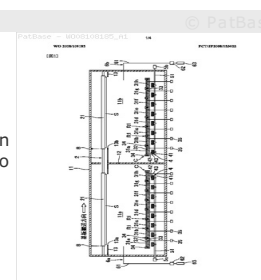
76) Family number: 42150143 (WO08108185A1)

THIN FILM FORMING METHOD, AND THIN FILM FORMING APPARATUS

Abstract: A sputtering apparatus is so constituted that film qualities such as a film thickness distribution or a specific resistance can be substantially homogenized all over the surface of a treated substrate when a predetermined thin film is formed by a reactive sputtering. Between a plurality of sputter chambers (11a and 11b) in which targets (31a to 31h) of an equal number are equidistantly juxtaposed, a treated substrate (S) is transferred to positions confronting the individual targets. An electric power is thrown into the individual targets in the sputter chambers, in which the treated substrate exists, so that the individual targets are sputtered to laminate identical or different thin films on the surface of the treated substrate. At this time, the stop position of the treated substrate is so changed that the portion of the treated substrate surface to confront the region between the individual targets may shift between the mutually continuing sputter chambers.

Probable Assignee: ULVAC CORP

Earliest Publication Date: 20080912



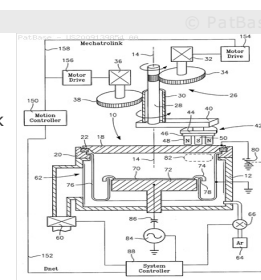
77) Family number: 43347752 (US2009139854A)

CONTROL OF ARBITRARY SCAN PATH OF A ROTATING MAGNETRON

Abstract: Source: US2009139854A A control system and method for controlling two motors determining the azimuthal and circumferential position of a magnetron rotating about the central axis of the sputter chamber in back of its target sputtering and capable of a nearly arbitrary scan path, e.g., with a planetary gear mechanism. A system controller periodically sends commands to the motion controller which closely controls the motors. Each command includes a command ticket, which may be one of several values. The motion controller accepts only commands having a command ticket of a different value from the immediately preceding command. One command selects a scan profile stored in the motion controller, which calculates motor signals from the selected profile. Another command instructs a dynamic homing command which interrogates sensors of the position of two rotating arms to determine if the arms in the expected positions. If not, the arms are rehomed.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 20090604



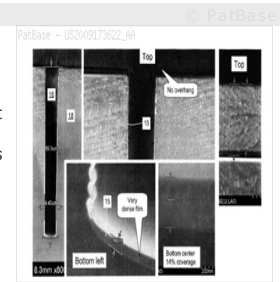
78) Family number: 43364107 (US2009173622A)

REACTIVE SPUTTERING WITH HIPIMS

Abstract: Source: US2009173622A A method and apparatus for sputter depositing an insulation layer onto a surface of a cavity formed in a substrate and having a high aspect ratio is provided. A target formed at least in part from a material to be included in the insulation layer and the substrate are provided in a substantially enclosed chamber defined by a housing. A plasma is ignited within the substantially enclosed chamber and a magnetic field is provided adjacent to a surface of the target to at least partially contain the plasma adjacent to the surface of the target. A voltage is rapidly increased to repeatedly establish high-power electric pulses between a cathode and an anode. An average power of the electric pulses is at least 0.1 kW, and can optionally be much greater. An operational parameter of the sputter deposition is controlled to promote sputter depositing of the insulation layer in a transition mode between a metallic mode and a reactive mode.

Probable Assignee: EVATEC AG

Earliest Publication Date: 20090611



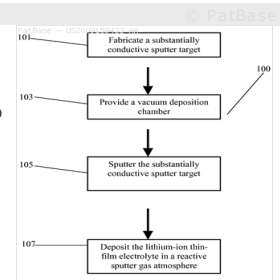
79) Family number: 43430293 (US2009159433A)

METHOD FOR SPUTTER TARGETS FOR ELECTROLYTE FILMS

Abstract: Source: US2009159433A Alternative sputter target compositions or configurations for thin-film electrolytes are proposed whereby the sputter target materials system possesses sufficient electrical conductivity to allow the use of (pulsed) DC target power for sputter deposition. The electrolyte film materials adopt their required electrically insulating and lithium-ion conductive properties after reactive sputter deposition from the electrically conducting sputter target materials system.

Probable Assignee: SAPURAST RESEARCH LLC

Earliest Publication Date: 20090625



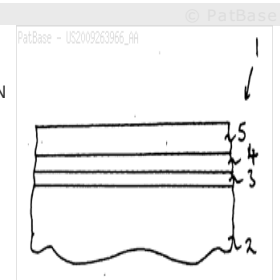
80) Family number: 43815508 (US2009263966A)

APPARATUS FOR SPUTTERING AND A METHOD OF FABRICATING A METALLIZATION STRUCTURE

Abstract: Source: US2009263966A A method of depositing a metallization structure (1) comprises depositing a TaN layer (4) by applying a power supply between an anode and a target in a plurality of pulses to reactively sputter Ta from the target onto the substrate (2) to form a TaN seed layer (4). A Ta layer (5) is deposited onto the TaN seed layer (4) by applying the power supply in a plurality of pulses and applying a high-frequency signal to a pedestal supporting the substrate (2) to generate a self-bias field adjacent to the substrate (2).

Probable Assignee: EVATEC AG

Earliest Publication Date: 20091008



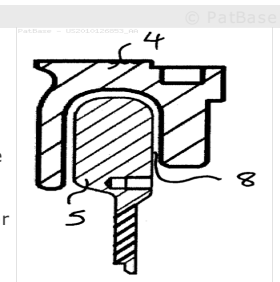
81) Family number: 45026629 (US2010126853A)

RF SPUTTERING ARRANGEMENT

Abstract: Source: US2010126853A Apparatus for sputtering comprises a vacuum chamber defined by at least one side wall, a base and a cover, at least one first electrode having a surface arranged in the vacuum chamber, a counter electrode having a surface arranged in the vacuum chamber and a RF generator. The RF generator is configured to apply a RF electric field across the at least one first electrode and the counter electrode so as to ignite a plasma between the first electrode and the counter electrode. The counter electrode comprises at least a portion of the side wall and/or the base of the vacuum chamber and an additional electrically conductive member. The additional electrically conductive member comprises at least two surfaces arranged generally parallel to one another and spaced at a distance from one another.

Probable Assignee: OERLIKON ADVANCED TECHNOLOGIES AG

Earliest Publication Date: 20100527



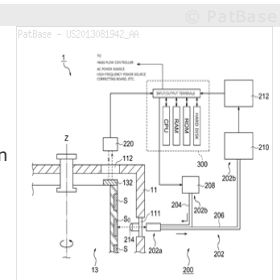
82) Family number: 50914499 (US2013081942A)

THIN FILM FORMATION METHOD AND THIN FILM FORMATION APPARATUS

Abstract: Source: US2013081942A A thin film formation method is provided, by which needless film formation due to trial film formation is omitted and film formation efficiency can be improved. This invention is a method for sputtering targets to form a film A having an intended film thickness of T1 as the first thin film on a substrate and monitor substrate held and rotated by a rotation drum and, subsequently, furthermore sputtering the targets used in forming the film A to form a film C having an intended film thickness of T3 as the second thin film, which is another thin film having the same composition as the film A; comprising film thickness monitoring steps S4 and S5, a stopping step S7, an actual time acquisition step S8, an actual rate calculating step S9 and a necessary time calculating step S24.

Probable Assignee: SHINCROON CO LTD

Earliest Publication Date: 20120412



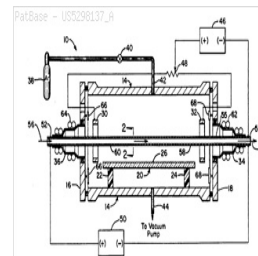
83) Family number: 8329060 (US5298137A)

METHOD AND APPARATUS FOR LINEAR MAGNETRON SPUTTERING

Abstract: Source: US5298137A An emission enhanced sputtering magnetron apparatus includes an elongated rod or bar like cathode jacketed by a target material. An electron emission enhancement device positioned around the end of the elongated cathode creates a thin, highly uniform plasma sheath along the remainder of the cathode, thereby enhancing the sputtering rate along the entire length of the cathode target material. A low voltage, high current AC or DC magnet supply connected across the elongated cathode generates a plasma-confining magnetic field circumferentially around the entire length of the cathode. In an alternate embodiment, a single elongated tube or bar of the target material can be conformed into the cathode, the electron emission enhancing device, and a working end portion that can be formed into nearly any shape to conform to the shape of the surface being coated with the target material.

Probable Assignee: SURFACE SOLUTIONS INC

Earliest Publication Date: 19921029



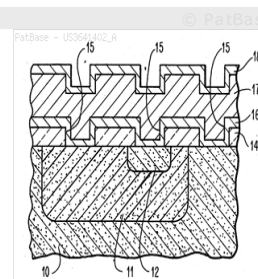
84) Family number: 1010389 (US3641402A)

SEMICONDUCTOR DEVICE WITH BETA TANTALUM-GOLD COMPOSITE CONDUCTOR METALLURGY

Abstract: Source: US3641402A A deposited film of gold is adhered to a layer of silicon dioxide by a deposited film of Beta tantalum. After the gold is deposited on the Beta tantalum, a second film of Beta tantalum is deposited on the gold. This forms a composite sandwich adhering the gold to the silicon dioxide without decreasing the conductivity of the gold and allowing another layer of silicon dioxide to be adhered to the second film of Beta tantalum.

Probable Assignee: IBM

Earliest Publication Date: 19710701



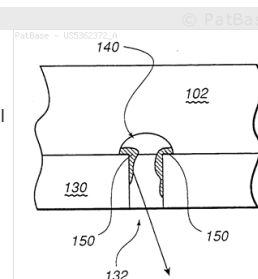
85) Family number: 10108105 (US5362372A)

SELF CLEANING COLLIMATOR

Abstract: Source: US5362372A A self cleaning collimator is provided which avoids a buildup of deposited material such that the collimator does not become clogged, deposition rates remain constant and flakes of deposited material are not formed. The collimator is formed of a dielectric material. The collimator and the target are physically mounted in contact with one another. During a deposition process, a portion of the deposited material will unavoidably also be deposited onto the walls of the passages through the collimator. Eventually, the buildup of such deposited material will provide an electrical path from the deposited material to the target. When this occurs, the electrical path will allow the material deposited on the walls of the passages through the collimator to act as a portion of the target. This material will then be depleted as it is deposited onto the semiconductor wafer 112.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19941108



86) Family number: 10284957 (NL8401722A)

CLEANING AND ADHESION PROMOTING OF POLYMER SUBSTRATES - PRIOR TO METALLISATION, BY GLOW DISCHARGE IN LOW PRESSURE OXIDISING ATMOS. USING METAL CATHODE WITH STABLE OXIDE LAYER

Abstract: A process for cleaning and promoting the adhesion of substrates that are to be coated with a metal layer comprises introducing the substrate into a vacuum chamber contg. at least one sputter cathode and exposing the substrate to a glow discharge in a low press. atmos. formed in the chamber. The substrate is of organic material or carries a layer of an organic adhesion providing material; the low press. atmos. is an oxidising atmos; the cathode is made from a metal which oxidised rapidly in the prevailing atmos. with the formation of a stable oxide layer on the metal; and the negative potential on the cathode w.r.t. the remainder of the chamber is chosen such that the glow discharge takes place without sputtering of the oxidised cathode surface.

Probable Assignee: LEER KONINKLL EMBALLAGE

Earliest Publication Date: 19851216

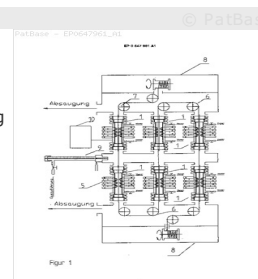
87) Family number: 10362152 (EP0647961A1)

DEVICE FOR COATING ELONGATED BENDABLE PRODUCTS.

Abstract: Source: EP0647961A1 Die Erfindung bezieht sich auf das Gebiet der Metallurgie und betrifft eine Vorrichtung zum Beschichten von langgestreckten biegsamen Erzeugnissen, wie z.B. Draehnte, Fasern. Der Erfindung liegt die Aufgabe zugrunde, eine Vorrichtung anzugeben, bei der vertikal durchzuziehende Erzeugnisse mit gleichmaessiger Schichtdicke beschichtet werden koennen. Die Aufgabe wird geloest durch eine Vorrichtung, enthaltend Elektrodenbloেকে, die aus hohlen zylindrischen Langkatoden und aus an den Stirnseiten der Langkatoden angebrachten Zylinderanoden und dazwischen angeordneten Isolierelementen mit einer gemeinsamen Mittelachse bestehen, Anordnungen zur Erzeugung eines Magnetfeldes, Anlagen zum Transportieren, Auf- und Abspulen der langgestreckten biegsamen Erzeugnisse, eine oder mehrere Vakuumkammern, mindestens eine Gaszufuehrung und eine Stromquelle, wobei bei der Vorrichtung mindestens zwei Elektrodenbloেকে vertikal uebereinander, die Anordnungen zur Erzeugung eines Magnetfeldes an der hohlen zylindrischen Langkatoden drehbar um und verschiebbar entlang der Langkatodenachse, und elektrisch isolierende Schirme zwischen den Langkatoden und den Zylinderanoden auf den Isolierelementen angeordnet sind.

Probable Assignee: MAT GMBH DRESDEN

Earliest Publication Date: 19950223



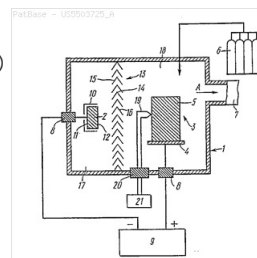
88) Family number: 10538239 (US5503725A)

METHOD AND DEVICE FOR TREATMENT OF PRODUCTS IN GAS-DISCHARGE PLASMA

Abstract: Source: US5503725A PCT No. PCT/RU92/00088 Sec. 371 Date Dec. 13, 1993 Sec. 102(e) Date Dec. 13, 1993 PCT Filed Apr. 23, 1992 PCT Pub. No. WO92/19785 PCT Pub. Date Nov. 12, 1992. A method for treatment of products in gas-discharge plasma consists in that a two-step vacuum-arc discharge is initiated between an anode (3) and an integrally cold cathode (2), featuring a metal-gaseous step of plasma and a gaseous step of plasma. The gaseous step of plasma is established by ionizing the working gas with electrons separated from the metal-gaseous step of plasma. Then a product (5) under treatment is preheated to working temperature and held in a preset temperature range. To this end, provision is made in the device for a means (13) for electron separation from the metal-gaseous step of plasma, which means is situated in the zone of the integrally cold cathode (2) and is impermeable to the metal ions generated by the cathode (2). In a particular case the means (13) is made as a set of V-shaped plates (14).

Probable Assignee: NOVATECH

Earliest Publication Date: 19921112



89) Family number: 106546 (US3574143A)

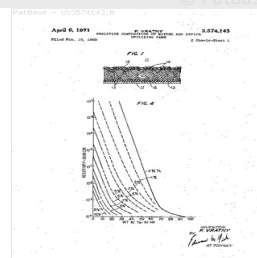
RESISTIVE COMPOSITION OF MATTER AND DEVICE UTILIZING SAME

Abstract: Source: US3574143A ABSTRACT OF THE DISCLOSURE

A novel resistive composition of matter of the general formula $(M,Hf)N_{2-x}$ wherein M is selected from the group consisting of tantalum and titanium and x ranges from 0.0-0.5 is obtained by reactive sputtering of metal cathodes in the presence of nitrogen at pressures ranging from 10-150 microns.

Probable Assignee: BELL TELEPHONE LABOR INC

Earliest Publication Date: 19700731



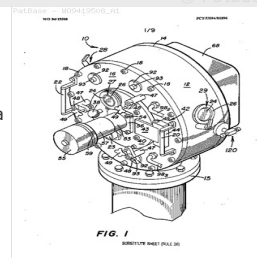
90) Family number: 10678901 (WO9419508A1)

SYSTEM FOR SPUTTERING COMPOSITIONS ONTO A SUBSTRATE

Abstract: An apparatus for producing a composite film of several elements on a substrate (25) such as a magnetic disk for a disk drive. The apparatus includes a sputtering chamber (30) and at least a first and second sputtering magnetrons (621 - 624) associated with a first target comprising a first component and a second target comprising a second component. A rotating chuck (50) is positioned in the chamber opposite the targets and a substrate (25) is mounted thereon and rotated so that target elements are simultaneously sputtered achieving a multi-component film coating on the surface of the substrate (25) with an even film gradient. In one embodiment, four targets each target comprising one of an element or composition of elements to be sputtered, are mounted abutting four magnetron assemblies (621 - 624).

Probable Assignee: CONNER PERIPHERALS INC

Earliest Publication Date: 19940901



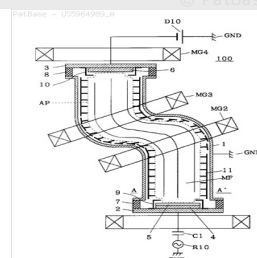
91) Family number: 10683196 (US5964989A)

IONIZED PVD DEVICE AND METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE

Abstract: Source: US5964989A Provided are an ionized PVD device capable of performing film formation having excellent vertical growth, and more particularly an ionized PVD device having a comparatively simple structure in which a rate of a metal film formed by neutral metal atoms can be reduced in a contact hole of a semiconductor substrate to perform film formation having excellent bottom coverage, and a method for manufacturing a semiconductor device using the ionized PVD device. Air-core coils are provided on an outside of a vacuum chamber concentrically with a central axis of the vacuum chamber and an extension axis of the central axis. The air-core coils are electromagnets for forming an S-shaped magnetic field in the vacuum chamber almost along a contour shape thereof. The air-core coils are provided so as to form the magnetic field in a straight portion in the vicinity of both ends of the vacuum chamber, and the air-core coils are provided so as to form the magnetic field in a bent portion of the vacuum chamber.

Probable Assignee: RENESAS ELECTRONICS CORP

Earliest Publication Date: 19980623



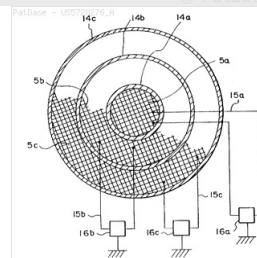
92) Family number: 10701239 (US5728276A)

TREATMENT APPARATUS

Abstract: Source: US5728276A In a treatment apparatus, a collimator is insulated electrically from the other equipment to be rendered electrically floating, and also the potential of the collimator is variably controllable by a variable DC power source. Therefore, the thickness in plane of the layer to be produced can be uniformized by controlling the voltage applied to the collimator, without changing both layout and figure of the hardware, e.g., permanent magnet, without process, and further without both beginning and end of a target.

Probable Assignee: TEL VARIAN KK

Earliest Publication Date: 19960305



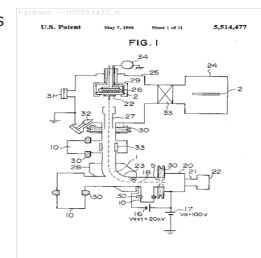
93) Family number: 10707218 (US5514477A)

CORROSION-RESISTANT LAMINATE WHICH CONSISTS OF A METAL OF A SINGLE MASS NUMBER DEPOSITED ON A SUBSTRATE

Abstract: Source: US5514477A A highly corrosive-resistant metal having a high purity and a specific plane index is manufactured by ion beam deposition (IBD). A thin film having less defects and impurities is obtained. A magnetoresistant effect film for a magnetoresistant effect type magnetic head which is highly corrosion-resistant and exhibits excellent characteristics can be formed. In IBD according to the present invention, metal ions are provided with adjusted ion energy of 10 to 100 eV, and a metal having a particular mass number is selected by a mass separation electromagnet.

Probable Assignee: HITACHI LTD

Earliest Publication Date: 19940316



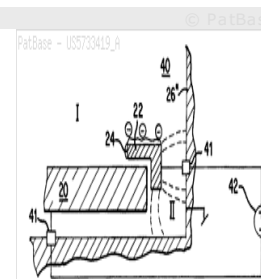
94) Family number: 10726916 (US5733419A)

VACUUM TREATMENT CHAMBER

Abstract: Source: US5733419A A vacuum treatment chamber has a sputtering electrode and a counter electrode together defining a plasma discharge area. The counter electrode has an electrode surface area which is not visible from the sputtering electrode. A third electrode, together with the non-visible surface area, defines an auxiliary plasma discharge space. A substantially unencumbered propagative electron path is established between the discharge spaces. A plasma discharge is generated between the sputtering electrode and the counter electrode within a vacuum chamber.

Probable Assignee: OERLIKON ADVANCED TECHNOLOGIES AG

Earliest Publication Date: 19970522



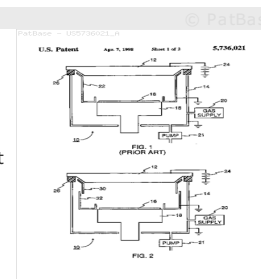
95) Family number: 10738048 (US5736021A)

ELECTRICALLY FLOATING SHIELD IN A PLASMA REACTOR

Abstract: Source: US5736021A In a plasma reactor, especially one intended for physical vapor deposition (PVD) onto semiconductor substrates, a shield disposed in front of the chamber walls between the PVD target and the substrates to protect the chamber walls. According to the invention, the shield is left electrically floating so that electrically charged ions and electrons emanating from the plasma or target and impinging upon the shield charge it to the point that the electrical flux is repelled.

Probable Assignee: APPLIED MATERIALS INC

Earliest Publication Date: 19980114



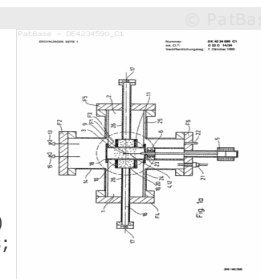
96) Family number: 10805045 (DE4234590C1)

TWO-SIDED CONTINUOUS COATING OF A SUBSTRATE - WITH THE SUBSTRATE PREHEATED TO A TEMP. ABOVE THE OPTIMUM PPTN. TEMP. BEFORE PLACED INTO THE COATING POSITION

Abstract: Source: DE4234590C1 The method for two-sided, continuous coating of a substrate by sputtering of materials with given stoichiometric composition in an evacuable chamber (14) filled with a background gas is characterised by the following: (a) the substrate (3) is heated - in a preheater (6) - to a temp. above the optimum precipitation temp., and is placed into the axis midpoint (9) of two cylindrical cathodes (1, 2) already in operation, for simultaneous two-sided coating; b) the temp. of the substrate is monitored by a sensor (12) whose signal controls the power of the cathodes (1, 2) and hence the temperature of the background gas in the chamber (14); c) a surrounding heating installation (18) maintains the temperature gradient of the background gas within given limits; d) after pptn. of the coating, the substrate is returned into the preheater (6) (which has been switched off) and is cooled down to the surroundings temp. in an atmos of oxygen. USE/ADVANTAGE - In surface coating technology. It allows simultaneous two-sided coating of substrates to be carried out at high temperatures, without the need for additional heat treatment processes to achieve superconductivity of the coating.

Probable Assignee: KERNFORSCHUNGSZ KARLSRUHE

Earliest Publication Date: 19931007



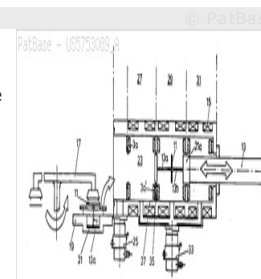
97) Family number: 10809975 (US5753089A)

SPUTTER COATING STATION

Abstract: Source: US5753089A A sputter coating station has a pair of opposing sputter sources. At least one of the sources encompasses a clear opening through which a workpiece mounting arrangement holding a workpiece can move for positioning the workpiece through the opening. A process for sputter coating workpieces uses the sputter coating station and includes holding the workpiece by a workpiece holder through the opening and into the coating chamber, and coating the workpiece using the sputtering sources.\!

Probable Assignee: UNAXIS BALZERS AG

Earliest Publication Date: 19970102



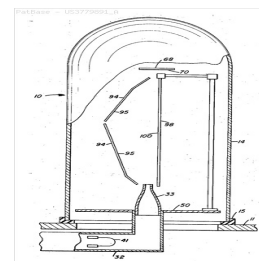
98) Family number: 109118 (US3779891A)

TRIODE SPUTTERING APPARATUS

Abstract: Source: US3779891A A triode sputtering apparatus to deposit material on the surface of an article. The apparatus comprises an enclosure means for evacuating the enclosure, a means for establishing an ion plasma in the enclosure. An ion target, including two members with surfaces of the material to be sputtered, is located in the enclosure with the surfaces facing the ion plasma. The target members are electrically biased so that ions from the plasma will impinge on their surfaces and sputter material therefrom. An article having a surface to be coated is mounted in the enclosure so that the surface faces the ion plasma and the sputtering surfaces of the target which are at an acute angle to the surface of the article. An electron funnel is used to funnel electrons being supplied to the plasma between the article and the target and an elongated anode is used to attract electrons from the plasma. The apparatus may be used to coat 11 by 11 inch glass plates with a metallic layer having substantially uniform optical density.

Probable Assignee: EASTMAN KODAK CO

Earliest Publication Date: 19701001



99) Family number: 10970453 (US5766426A)

APPARATUS FOR, AND METHOD OF, DEPOSITING A FILM ON A SUBSTRATE

Abstract: Source: US5766426A An electrical field between a positive anode and a negative target in a cavity and a magnetic field in the cavity cause electrons from the target to ionize neutral gas (e.g. argon) atoms in the cavity. The ions cause the target to release sputtered atoms (e.g. aluminum) for deposition on a substrate. A shield between the target and the substrate inhibits charged particle movement to the substrate. The anode potential may be positive, and the shield and the magnetic members may be negative relative to the anode, to obtain electron movement to the anode, thereby inhibiting the heating of the shield and the magnetic members by electron impingement. The anode may be water cooled. The magnitude of the positive anode voltage relative to the target voltage provides selectively for (a) a uniform thickness of sputtered atoms on the walls of a groove in the substrate or (b) a filling of the groove by the sputtered atoms and a uniform thickness of deposition on the substrate surface including the filled groove. Progressive increases in the anode voltage produce progressive increases in the rate of the sputtered atom deposition on the substrate. A sensor may receive infra red energy passing from the substrate through a hole in the anode to provide signals having characteristics indicating variations in the substrate temperature. The anode voltage is varied in accordance with the characteristics of such signal to regulate the temperature of the substrate. The target voltage is preferably varied with the anode voltage variations to maintain the anode-cathode voltage difference substantially a constant.

Probable Assignee: SPUTTERED FILMS INC

Earliest Publication Date: 19980616

