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Patent Number	Inventor	Title	Abstract
7,528,060	Luis Fonseca Oscar Resto Francisco Sola UPR Río Piedras	Branched Nanostructures and Method of Synthesizing the same	A branched nanostructure is synthesized. A porous material, with pores having a diameter of approximately 1 µm or less, is placed in a vacuum. It is irradiated with an electron beam. This causes a trunk to grow from the porous material and further causes branches to grow from the trunk.
7,361,643	Dipak K. Banerjee Juan A. Martínez UPR Medical Sciences	Methods for inhibiting angiogenesis	A method for inhibiting angiogenesis, including: administering a nucleoside, such as tunicamycin, in an amount effective to inhibit angiogenesis, to a patient in need of such treatment. A method for inhibiting angiogenesis including administering a nucleoside, which comprises glucosamine in an amount effective to inhibit angiogenesis to a patient in need of such treatment; where in the nucleoside is administered for a period of time, subsequently the administration of the nucleoside is suspended for a period of time of at least one week, and subsequently the administration of the nucleoside is resumed.
7,160,575	Nicholas J. Pinto UPR Humacao Fouad Aliev UPR Río Piedras	Conducting Polymer	Measurement in the frequency range 3mHz-106 of the dielectric characteristics of emeraldine base polyaniline dissolved in 1-methyl-2-pyrrolidinone (NMP) and cast into bulk free-standing polymer films shows features similar to those reported by others and ahich are a result of microphase separation into reduced and oxidized repeat units. However, upon confinement into the cylindrical pores, of average diameter 20 nm, of a porous membrane such features of microphase separation do not occur. The microphase separation observed in the bulk polymer is suppressed by strong pinning of the charge carriers due to interactions of the polymer with pore walls together with constrained chain packing and a non-uniform rate of evaporation of the NMP solvent from the pores. This enhances the bulk conductivity after doping by reducing the internal intra-chain disorder introduced by microphase separation.

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Patent Number	Inventor	Title	Abstract
7,157,144	Ram S. Katiyar Pijush Bhattacharya Rasmi R. Das UPR Río Piedras	Giant Remnant Polarization in laser ablated $SRBI_2NB_2O_9$ thin films on $PT/TIO_2/SIO_2/SI$ substrates	$SRBI_2NB_2O_9$ (SBN) thin films are deposited on $PT/TIO_2/SIO_2/SI$ substrates using off-axis pulsed laser deposition technique. Off-axis laser ablation avoids plasma damaging of the surface of SBN thin films and is favorable to grow films along the polarization axis (a-b plane). SBN thin films are grown at 350º C. substrate temperature, with 5mm away from the plasma focus , and annealed at 750º C. for 1 hour in oxygen ambient. These SBN thin films exhibited giant remnant polarization (P_r) of 50 µC/cm^2 with coercive field of 190 kV/cm. The fatigue endurance of these SBN thin films was measured at 400 kV/cm and showed minimal (<20%) polarization degradation of up to 10^{10} switching cycles. The leakage current density of SBN thin films was found to be about $2x10^7$ up to an applied field of 100 kV/cm. The above-mentioned properties of off-axis deposited SBN thin films, makes it a good material for NVRAM devices.
7,109,345	Margarita Ortiz-Marciales Melvin De Jesús Eduvigis González Sandraliz Espinosa Wildeliz Correa –Ramírez UPR Humacao	Efficient and convenient procedure for the synthesis of B-alkylated oxazabordidius derived from ephedrine and norephedrine	A novel and efficient alkylatiion procedure of B—H1,3,2-oxazaborolidines derived from ephedrine and norephedrine has been established. Representative B-butyl- and B-methyl-1,3,2-oxazaborolidines were prepared in good yield and excellent purity by one pot treatment of the parent boraheterocyclic compound with the corresponding organolithium reagent and subsequent hydrolysis of the cyclic borohydride with anhydrous ammonium chloride.
7,081,371	Ram S. Katiyar Pijush Bhattacharya Rasmi R. Das UPR Río Piedras	Fabrication of stable, Wide-Bandgap Thin Film of Mg, Zn and O	A stable, wide-bandgap (approximately 6 eV) ZnO/MgO multiplayer thin film is fabricated using pulsed-laser deposition on c-plane Al_2O_3 substrates. Layers of ZnO alternate with layers of MgO. The thickness of MgO is a constant of approximately 1nm; the thickness of ZnO layers vary from approximately 0.75 to 2.5nm. Abrupt structural transitions from hexagonal to cubic phase follow a decrease in the thickness of ZnO sublayers within this range. The band gap of the thin films is also influenced by the crystalline structure of multiplayer stacks. Thin films with hexagonal and cubic structure have a band-gap values of 3.5 and 6 eV, respectively. In the hexagonal phase, Mg content of the films is approximately 40%; in the cubic phase Mg content is approximately 60%. The thin films are stable and their structural and optical properties are unaffected by annealing at 750^o C.

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Patent Number	Inventor	Title	Abstract
7,052,677	Raphael Raptis Peter Baran UPR Río Piedras	Substituted octanuclear pyrazolato clusters with electron transfer and MRI contrast agent properties	The present invention is directed to an Fe(III) complex comprising a redox-active metal cluster in a chemically inert shell. The inventive complex has electron transfer and paramagnetic properties.
6,953,536	Weiyi Jia UPR Mayagüez William M. Yen Dongdong Jia Xiao-Jun Wang University of Georgia Research Foundation	Long persistent phosphors and persistent energy transfer technique	The invention provides long-persistent phosphors, methods for their manufacture and phosphorescent articles. The invention also provides a method for generating a long-persistent phosphorescence at a selected color. The phosphors of the invention may be alkaline earth aluminates, alkaline earth silicates, and alkaline earth aluminosilicates. The phosphors include those activated by cerium. The phosphors also include those in which persistent energy transfer occurs from a donor ion to an acceptor ion, producing persistent emission largely characteristic of the acceptor ion.
6,799,464	Claudio Guerra Fredy Zypman UPR Humacao	The Macroscopic Model of Scanning Force Microscope	A new apparatus that serves to demonstrate the basic concepts of force measurements with the atomic force microscope.
6,644,137	Michael Bellamy Robert Pastor Norman Mortenson UPR Mayagüez	Sampling Probe	Sampling probes used to collect samples of a powder blend in pharmaceutical applications. While the invention is subject to a wide range of applications, it is specially suited for use in an apparatus or in a process; and it will be particularly described in that connection.
6,608,205	Alexander Leyderman Yunlong Cui UPR Mayagüez	Organic Crystalline films for optical applications and related methods of fabrication	The present invention provides organic single crystal films of less than 20μm, and devices and methods of making such films. The crystal films are useful in electro-optical applications and can be provided as part of an electro-optical device which provides strength, durability, and relative case of manipulation of the mono-crystalline films during and after crystal growth.

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Patent Number	Inventor	Title	Abstract
6,596,259	Raphael Raptis UPR Río Piedras	Metal cubane structure contained in an octanuclear complex stable over several oxidation states and a method of producing the same	The present invention is directed to a complex comprising a redox-active metal cluster in a chemically inert shell. The inventive complex has the formula M.sub.8 (.mu..sup.4 -E).sub.4 (.mu.-L).sub.12 X, where M is chosen from a transition metal, a lanthanide, an actinide and mixtures thereof; E is a chalcogenide; L is a bridging ligand; and X is a terminal ligand. The chemically inert shell enables the complex to exhibit structural stability over several oxidation states, and to exhibit reversible electrochemical reduction properties. A single reactor method of making this complex from simple starting materials is also disclosed. The active center further allows the octanuclear complex to be used in making supercluster assemblies that have electron transfer properties or in making contrasting agents for MRI applications, for example.
6,539,738	Jorge E. González Gerson Beauchamp UPR Mayagüez	Compact Solar-Powered Air Conditioning Systems	A design of a compact solar air conditioning system especially suited for tropical climates, includes an air-cooled single-effect absorption machine driven by an array of high performance flat-plate collectors along with a thermal storage tank. The absorption machine uses lithium-bromide as a refrigerant and a water-based absorption fluid. The operation of the compact solar air conditioning system is determined by an optimal control strategy.
6,536,677	Luis V. Meléndez Jorge E. González Gerson Beauchamp UPR Mayagüez	Automation and Control of Solar Air Conditioning Systems	A solar powered air conditioning system includes an absorption machine coupled to three primary loops. A heat loop provides energy to the absorption machine. A cooling tower loop exhausts heat from a room or building. The heat loops provides energy from a boiler and/or from a number of solar collectors. In one mode of operation, the solar collectors circulate through a storage tank. The flow through the solar collectors is regulated to maximize energy collection.

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Patent Number	Inventor	Title	Abstract
6,534,134	Félix E. Fernández UPR Mayagüez	Apparatus and Method for Pulsed Laser Deposition of Materials on Wires and Pipes	Methods and apparatuses are disclosed which allows uniform coatings to be applied by pulsed laser deposition (PLD) on inner and outer surfaces of cylindrical objects, such as rods, pipes, tubes, and wires. The use of PLD makes this technique particularly suitable for complex multicomponent materials, such as superconducting ceramics. Rigid objects of any length, i.e., pipes up to a few meters, and with diameters from less than 1 centimeter to cover 10 centimeters can be coated using this technique. Further, deposition is effected simultaneously onto an annular region of the pipe wall. This particular arrangement simplifies the apparatus, reduces film uniformity control difficulties, and can result in faster operation cycles. In addition, flexible wires of any length can be continuously coated using the disclosed invention.
6,533,304	Mauricio Lizama UPR Research Institute FILIUS David Serrano Dennis Martell Eduardo F. Carlo Eduardo Bravo UPR Mayagüez	Mechanically Assisted Standing Wheelchair	The present invention provides a hydraulic powered wheelchair pivotable from a sitting position to a standing position with minimal user effort. The pivoting frame assembly includes a rigid horizontally arranged wheel support structure, a single vertical extending member secured to the wheel support structure and centered between the wheels, and a pivoting frame linkage assembly pivotably connected at the upper end of the vertically extending member. A hydraulic jack rests on the wheel support structures, and is connected at the other end to the seat support members of the pivoting assembly. A user of the wheelchair pivots a lever assembly to raise the the jack, and thus raise the chair to the standing position. An electric buzzer system is integrated with the wheelchair, and an alarm informs the operator when the chair has reached the standing position.
6,489,357	Abimael D. Rodríguez Osvaldo Rosario UPR Río Piedras Vesna Eterovic Pedro A. Ferdchmin Richard M. Hann Oné R. Pagán Universidad Central del Caribe	Tobacco Cembranoids Block the Expression of the Behavioral Sensitization to Nicotine and Inhibit Neuronal Acetylcholine Receptors	The subject invention relates the use of cembranoids to inhibit nicotine addiction at the behavioral level. The subject host is sensitized to nicotine. Cembranoids are then administered to reduce such sensitization.

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Patent Number	Inventor	Title	Abstract
6,452,170	Fredy Zypman UPR Humacao Steven J. Eppell Case Western Reserve University	Scanning Force Microscope to Determine Interaction Forces with High-Frequency Cantilever	An apparatus and method for determining a force of interaction between a sample and a tip on a cantilever. The method uses a non-Hookian equation to model the cantilever as it is deflected by the force of interaction between the sample and the cantilever tip. The sample is positioned at a predetermined distance from the cantilever tip such that the cantilever is deflected by the force of interaction. The positions of a plurality of points on the cantilever are then rapidly measured and the force of interaction from the measured positions is then obtained using a non-Hookian model that accounts for higher order vibrational modes of the cantilever.
6,267,911	Weiyi Jia UPR Mayagüez William Yen Lizhu Lu Huabiao Yuan University of Georgia Research Foundation	Long Persistence Green Phosphorescence	This invention relates to phosphors including long-persistence green phosphors. Phosphors of the invention are represented by the general formula: M.sub.k Al.sub.2 O.sub.4 :2xEu.sup.2+,2yR.sup.3+ wherein k-1-2x-2y, x is a number ranging from about 0.0001 to about 0.05, y is a number ranging from about x to about 3x, M is an alkaline earth metal, and R.sup.3+ is one or more trivalent metal ions. Phosphors of this invention include powders, ceramics, single crystals and single crystal fibers. A method of manufacturing improved phosphors and a method of manufacturing single crystal phosphors are also provided.
6,231,920	Ana R. Guadalupe Yizhu Guo UPR Río Piedras	Electranalytical Applications of Screen-Printable Surfactant-Invoiced Sol-Gel Graphite Composites	A process for preparing sol-gel graphite composite electrodes is presented. This process preferably uses the surfactant bis(2-ethylhexyl) sulfosuccinate (AOT) and eliminates the need for a cosolvent, an acidic catalyst, a cellulose binder and a thermal curing step from prior art processes. Fabrication of screen-printed electrodes by this process provides a simple approach for electroanalytical applications in aqueous and nonaqueous solvents. Examples of applications for such composite electrodes produced from this process include biochemical sensors such as disposable, single-use glucose sensors and ligand modified composite sensors for metal ion sensitive sensors.
6,227,981	Mauricio Lizama UPR Research Institute FILIUS	Ball Ramp Assembly	The present invention contemplates an improved ball ramp assembly that enables even the most severely handicapped bowler to guide and accelerate a bowling ball toward the intended bowling pins. The bowling ramp assembly includes a ramp having a ball guide defining a ball path along the ramp, a base coupled to a proximal end of the ramp for supporting the ramp, a ball release coupled to the ramp for selectively controlling travel of the ball along the ramp, and a positioning assembly coupled to the ramp

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Patent Number	Inventor	Title	Abstract
	David Serrano Joel Rivera José Soto Raúl Jordán Lorenzo Detrés UPR Mayagüez		for adjusting the orientation of the ramp. The ball release includes a ball stopping member that moves between a ball blocking position and a ball releasing position. The positioning assembly includes at least one motor coupled to the ramp and a wheel located at the distal end of the ramp. The ball release and positioning assembly are both controlled by switches which may be located remotely from the ramp.
6,204,289	Abimael Rodríguez UPR Río Piedras Vesna Eterovic Richard M. Hann Pedro A. Ferchmin Oné R. Pagán Misty J. Eaton Universidad Central del Caribe	Cembranoid Inhibitors of Nicotinic Acetylcholine Receptors	The present invention relates to the use of cembranoids to inhibit nicotinic acetylcholine receptors.
6,198,530	Alexander Leyderman UPR Mayagüez	Organic Crystalline Films	A method for forming an optical device includes the steps of providing a first plate having a first face defining a recess, filling the recess with a material which can be crystallized, and covering the first face and the recess with a second plate having a second face, so that the second face is in contact with the first face and the material in the recess is completely enclosed by the first and second plates. The material in the recess is thereby protected from chemical and mechanical damage, as well as evaporation. In addition, the plates can be transparent, allowing the material in the recess to be visually monitored. A grown crystalline film packed in the cell can be used as a non-liner and/or electro-optical device.

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Patent Number	Inventor	Title	Abstract
6,171,198	Mauricio Lizama UPR Research Institute FILIUS David Serrano Eileen Avilés Félix J. Santana-López Victor M. Valentín UPR Mayagüez	Merry-Go-Round for Wheelchair	A merry-go-round with a frame supported for rotation by a plurality of driven wheels, the merry-go-round having a space for a wheel chair and a space for a non-wheel chair bound person. Each separate space on the merry-go-round is associated with a respective crank assembly such that a person in that space can drive one of the driven wheels through a crank. A plurality of smaller wheels secured to the underside of the frame provides additional support for the merry-go-round. The person in the non-wheel chair bound space can stand on the frame, or in an alternate embodiment can sit on a chair. Because the merry-go-round has spaces for both wheel chairs and non-wheel chair bound people, both can use the merry-go-round at the same time.
6,170,202	Hamid Davoodi Frederick A. Just Ali Saffar Mohammad N. Noori UPR Mayagüez	Building System Using Shape Memory Alloys	A system and method is described by which the structural integrity of a building or other structure can be increased and made more resistant to earthquake damage. A structural member may be incorporated into a building structure. At least a portion of the structural member is made of a material that undergoes a shape or phase transformation in response to energy applied. This member can alter the natural frequency of the building structure from a first natural frequency to a second natural frequency when the material undergoes the transformation to make destructive resonance less likely to occur.
6,145,374	Fredy R. Zypman UPR Humacao Steven J. Eppell Case Western Reserve University	Scanning Force Microscope with High-Frequency Cantilever	An apparatus and a process for determining resonant frequencies for a cantilever used to measure tip-to-sample distances on a scanning force microscope. The process uses a non-linear equation and does not require knowledge of the shape of the cantilever to obtain the measured forces. As the tip-to-sample distance varies, the resonant frequency of the cantilever changes. Instead of measuring the positions of the tip and sample and the spring constant (k) of the cantilever, the present invention measures the resonant frequency at each data point. The shifts in frequencies contain the information necessary to reconstruct the force-distance curve.

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Patent Number	Inventor	Title	Abstract
6,117,362	Weiyi Jia UPR Mayagüez William Yen University of Georgia Research Foundation	Long Persistence Blue Phosphorescence	This invention relates to phosphors including long-persistence blue phosphors. Phosphors of the invention are represented by the general formula: MO . mAl.sub.2 O.sub.3 :Eu.sup.2+,R.sup.3+ wherein m is a number ranging from about 1.6 to about 2.2, M is Sr or a combination of Sr with Ca and Ba or both, R.sup.3+ is a trivalent metal ion or trivalent Bi or a mixture of these trivalent ions, Eu.sup.2+ is present at a level up to about 5 mol % of M, and R.sup.3+ is present at a level up to about 5 mol % of M. Phosphors of this invention include powders, ceramics, single crystals and single crystal fibers. A method of manufacturing improved phosphors and a method of manufacturing single crystal phosphors are also provided.
5,746,823	Alexander Leyderman UPR Mayagüez	Organic Crystalline Films for Optical Applications and Related Methods of Fabrication	A method for forming an optical device includes the steps of providing a first plate having a first face defining a recess, filling the recess with a material which can be crystallized, and covering the first face and the recess with a second plate having a second face, so that the second face is in contact with the first face and the material in the recess is completely enclosed by the first and second plates. The material in the recess is thereby protected from chemical and mechanical damage, as well as evaporation. In addition, the plates can be transparent, allowing the material in the recess to be visually monitored. A grown crystalline film packed in the cell can be used as a non-liner and/or electro-optical device.
5,557,471	Félix Fernández UPR Mayagüez	Lens for Depositing Target Material on a Substrate	A method of depositing a thin layer of a target material on a substrate is disclosed. The method comprises illuminating the material with at least one elliptical laser beam so that a desposition plume is emitted from the target material, then positioning the substrate to receive the material emitted by the deposition plume. An apparatus for practicing the method and a multi-faceted negative axicon for forming a plurality of concentric laser beams are also disclosed.

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Patent Number	Inventor	Title	Abstract
5,475,228	José Palathingal UPR Mayagüez	Unipolar Blocking Method and Apparatus for Monitoring Electrically Charged Particles	An apparatus for monitoring an electrically charged particle pulse includes at least one coil defining an opening therethrough. The coil generates a bipolar signal responsive to the electrically charged particle pulse passing through the opening, and the bipolar signal comprises a first portion having a first polarity and a second portion having a second polarity. Unipolar blocking diode connected to the coil passes the first portion of the bipolar signal having a first polarity and blocks the second portion of the bipolar signal having the second polarity. Monitoring Device connected to the unipolar blocking diode generates an output signal representative of a predetermined characteristic of the particle based upon the first portion of the bipolar signal which is passed by the unipolar blocking diode. In a preferred embodiment, the coil has a toroidal shape and comprises a plurality of windings electrically connected in parallel, and each of these windings comprises a plurality of conductive loops. The apparatus may also comprise a series of coils arranged so as to define a predetermined path for passage of the electrically charged particle through each respective opening of each respective coil.
5,470,572	Edmundo Kraiselburd UPR Medical Sciences Campus	Non-Infectious Simian Immunodeficiency Virus Particles Produced by Cell Line CRL 11393	A cell line capable of producing SIV viral materials without producing infectious viral particles is disclosed. The SIV viral particles produced are immunogenic and non-infectious. The cell line and the products produced by the cell line are useful for diagnostic purposes and for immunization purposes.
5,468,500	Manuel Rodríguez Flores Sonia Rivera González UPR Mayagüez	Soursop Flavor	A natural tasting soursop flavoring composition prepared by combining methyl butanoate, methyl 2-butenoate, butanoic acid, methyl hexanoate, methyl 2-hexenoate, hexanoic acid and linalool.
5,405,659	Félix Fernández UPR Mayagüez	Method and Apparatus for Removing Material from a Target by Use of a Ring-Shaped Elliptical Laser Beam and Depositing the Material onto a Substrate	Method and apparatus for depositing a thin layer of a target material onto a substrate by illuminating the target material with at least one ring-shaped elliptical laser beam so that a ring-shaped deposition plume is emitted from the target material, and positioning the substrate to receive the emitted material. Concentric, ring-shaped elliptical laser beams are formed by use of a multi-faceted negative axicon.

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Patent Number	Inventor	Title	Abstract
5,274,689	José Palathingal UPR Mayagüez	Tunable Gamma Ray Source	A source of gamma rays (a photon beam) at a single energy produced by the single-quantum annihilation of accelerated positrons with electrons of a target element. The photons are emitted predominantly in the forward direction and are accompanied by background radiation which can be differentially suppressed. The energy of the photons is determined by varying the energy of incident positrons. The photon beam is usable in materials research and analysis, medical diagnosis and therapy, and numerous other fields.
5,059,294	Paul Lizardi UPR Río Piedras	Method for Separating Nucleic Acids and Nucleid Acid Probes	An improved method and device for nucleic acid hybridization assay employing combined direct an alternating field electrophoresis are disclosed. In the method of the present invention, a sample is hybridized with nucleic acid probe and is contacted with a support medium where direct and alternating electric fields are applied. Under the influence of the electric fields, hybrid separates from non-specifically bound nucleic acid probe. The hybrid may be measured on the support medium itself as on a paper strip or in a cartridge containing support medium or may be blotted on an inert surface and then measured. The method an device are useful in the diagnosis of diseases. Kits are provided for assay of a large number of diseases.