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Tourmaline



Tourmaline, "The Electric Stone", is exploited in hundreds of patents. Here are several select patents and articles of especial interest in regard to the production of electricity by tourmaline, and agriculture.

See also : T.T. BROWN / Petrovoltaics ... Earth Batteries ... John HUTCHISON / Hutchison Effect &c...

MANUFACTURE OF SEMIPERMANENT BATTERY JP7302596

1995-11-14

Inventor(s): KITA MASAYUKI; KITAMURA KAZUO; ASATANI TAKUO

Applicant(s): OYO KOGAKU KENKYUSHO KK

Classification: - international: H01M6/06; H01M6/16; H01M10/02; H01M6/04; H01M6/16; H01M10/02; (IPC1-7): H01M6/06; H01M6/16; H01M10/02

Abstract -- PURPOSE:To provide a semipermanent battery by putting far infrared radiation ceramic powder or a far infrared radiation ceramic powder pack in an inside electrolyte solution of a primary battery or a secondary battery, and naturally charging to recover the original potential.

CONSTITUTION:Pulverized tourmaline fine powder belongs to far infrared radiation ceramics, and is put in an electrolyte of a battery as powder or being packed. It was found that even if the battery is discharged, the potential does not change. When a lithium battery was tested in the condition of 500mA discharge for 10 minutes and rest for 4 hours, voltage did not vary over 7 month. It is thought that the recess of an ionic crystal of the powder is charged positively and the other end is charged negatively to produce potential, dynamic energy such as temperature is converted into electric energy, and in addition by electromagnetic radiation from the far infrared radiation stone, oxidized electrolyte is reduced.

PERMANENT ELECTRODE FIBER AND ITS PRODUCTION

JP6184808

1994-07-05

Inventor(s): KUBO TETSUJIRO; KAWAGUCHI KOTARO

Classification: - international: D01F1/10; D01F2/06; D06M11/00; D06M11/49; D06M101/00; D06M101/02; D06M101/06; D01F1/10; D01F2/00; D06M11/00; (IPC1-7): D01F1/10; D01F2/06; D06M11/49

Also published as: JP2715034

Abstract -- PURPOSE: To provide a permanent electrode fiber composed of a regenerated or synthetic fiber containing a tourmaline powder finely pulverized by a tromill in combination with a highly orientated crystalline tourmaline as a permanent electrode substance distributed in the fiber surface layer and capable of giving a favorable electric stimulation to the human body so as to activate the human body and to provide its production method. CONSTITUTION: A permanent electrode fiber containing a permanent electrode substance highly orientated and distributed in the surface layer of the fiber is formed by mixing the permanent electrode substance having electrodes at both the ends of the crystal structure in a regenerated or synthetic fiber.; The permanent electrode fiber containing a permanent electrode substance highly orientated and distributed in the surface layer of the fiber can be formed also by uniformly mixing and dispersing 1 to 5wt.% natural or artificial permanent electrode substance powdered into $\leq 1\mu\text{m}$ liquefied raw material such as a regenerated or synthetic fiber or blending a suspension of a titanium oxide-containing permanent electrode substance powder with liquefied raw material such as a regenerated or synthetic fiber and spinning it through a spinning nozzle while allowing it to pass through an external magnetic field.

Artificially-synthesized tourmaline crystalline substance and its preparation method

CN1800014

2006-07-12

Inventor(s): CHEN YANDONG [CN]

Applicant(s): SHENZHEN FANGHAO INDUSTRY CO L [CN]

Classification: - international: C01B33/20; C01B33/00

Abstract -- The invention discloses an artificial synthetic tourmaline crystal and synthetic method, which consists 2-10 percent tourmaline and 90-98 percent mineral, wherein the tourmaline and mineral are grinded into grain size mixture less than 15 nm, which is grinded into grain size more than 15 nm after melted at more than 1600 deg.c. The invention can produce large amount of negative ion, which absorbs artificial synthetic tourmaline crystal with positive charge odor, bacteria, smog and harmful gas.

Dynamoelectric monomers, and self-discipline generating set of possessing the monomers

CN1960051

2007-05-09

Inventor(s): QUJING BOMEI SHANG [CN]

Applicant(s): LIUJIA INT TRADE TIANJIN CO LT [CN]

Classification: - international: H01M10/36; H02J7/00; H01M10/36; H02J7/00

Abstract -- Pressing powder of tourmaline covered by lithium metal produces the disclosed power generation unit. The invention also discloses self-discipline generating set composed of multiple connected power generation units, as well as not contact charging circuit system including combinations between power generation unit and electromagnetism, or the unit and light, or the unit and solar energy. When accomplishing charging to self, the power generation unit can transport redundant electric energy to other power generation units at a time. The invention also includes micro intelligent operation system CPU in use for controlling and managing generating, charging electricity and transporting electricity to other units. In condition of without external electrical source, the disclosed power generation unit self can produce stable and long lasting electric energy.

Tourmaline nano metal oxide and preparation method thereof

CN1990385

2007-07-04

Inventor(s): LI XUECHENG DING [CN]

Applicant(s): SHANGHAIHUZHENG NANO TECHNOLOG [CN]

Classification: - international: C01G1/02; C01G1/02

Abstract -- The invention relates to a nano tourmaline metal oxide, which especially can increase anion release efficiency. Said metal oxide comprises tourmaline metal oxide with grain size being 5-30nm and nano silver granular with grain size being 0.2-1 um; nano silver granular is attached to the surface of tourmaline metal oxide. The invention makes use of the tourmaline metal oxide coated with nano silver granular and the powder phase of tourmaline metal oxide to dramatically increase the release amount of anion and far infrared rays, which improves treating effect for human body. The invention aslo relates to the method for preparing said nano tourmaline metal oxide.

ELECTROMAGNETIC WAVE DISTURBANCE PREVENTING MATERIAL

JP2004103783

2004-04-02

Inventor(s): SATO TSUNEO; SATO AKIHARU

Classification: - international: E04B1/92; H05K9/00; E04B1/92; H05K9/00; (IPC1-7): H05K9/00; E04B1/92

Abstract -- **PROBLEM TO BE SOLVED:** To provide an electromagnetic wave disturbance preventing material which keeps an residence environment and an office environment free from an electromagnetic wave disturbance by using this material as an internal material in an office and a residence or external materials for various kinds of electric products and electronic appliances. ; **SOLUTION:** The material is composed of an electromagnetic wave absorbing and extinguishing member 1 formed by coating an unwoven fabric, paper, etc. with an electromagnetic wave absorbing and extinguishing substance formed by mixing the fine powder of tourmaline and that of bamboo charcoal into a binding material by adhesion, a decoration panel member 2 which is secured to one surface of the electromagnetic wave absorbing and extinguishing member, and composed of paper, cloth, an wood plate, a synthetic resin plate, a synthetic resin sheet, etc.; an electromagnetic wave reflection member 3 which is secured to the other surface of the

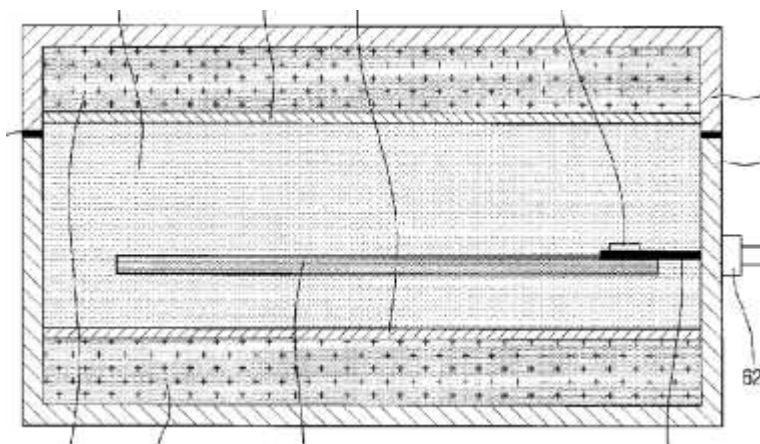
electromagnetic wave absorbing and extinguishing member, and composed of a metal plate such as an aluminum plate and a stainless plate.

Device for Saving Electrical Power

WO 2008/133438

Inventor: CHOI, Sung

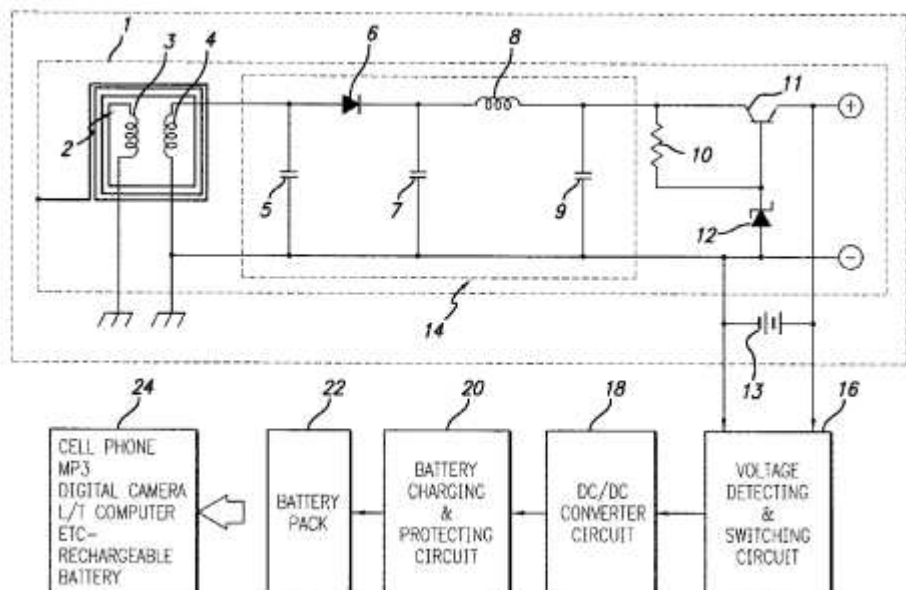
Abstract -- A device for saving electric power of the present invention comprises a case; a tourmaline insert accommodated in the case body, which is a mixture of tourmaline powder, permanent magnet powder and moisture (H₂O); ionization plates respectively positioned on the upper and lower surfaces of the tourmaline intermediate layer interposed therebetween and a conductive plate embedded in the tourmaline intermediate layer.



WO 2008/156489

Wireless Electrical Charging System

Abstract -- An apparatus wirelessly recharges a rechargeable battery. The apparatus includes a wireless receiver that amplifies radio waves, the wireless receiver comprising a tourmaline and zeolite ceramic. The recharging apparatus also includes a patch antenna that filters the received radio waves to usable RF signals. The recharging apparatus further includes circuits that process the usable RF signals to create refined electric power for the rechargeable battery.



[0012] A tourmaline/zeolite ceramic 1 receives RF signals and significantly amplifies the signal. In one embodiment, the signal strength is increased by 5 times compared with a ceramic without the tourmaline/zeolite ceramic 1. The ceramic 1 absorbs RF signals across a wide range of frequencies and can include energy from a variety of sources such as fluorescent lights and cellular signals.

[0013] In an exemplary embodiment, the ceramic is a piezoelectric bender part number AB1560B manufactured by Projects Unlimited Inc. The ceramic is supplemented with approximately a 1 mm coating along the exposed tourmaline surface. The coating includes a mixture of about equal parts tourmaline, zeolite, and epoxy. The mixture is added to the ceramic from a dropper, and then heated to 120F to uniformly distribute the coating along the exposed surface, and also extend about 5% beyond the surface of the tourmaline surface. The ceramic 1 receives a very wide range of frequencies. Although a piezoelectric ceramic is described, any zeolite/tourmaline composite 1 on a substrate could perform the signal amplification.

METHOD OF REMOVING SILICON CONTAINED IN WATER AND EQUIPMENT FOR THE SAME

JP2004141832

2004-05-20

Inventor(s): FUKAI TOSHIHARU

Classification: - international: C02F1/42; C02F1/60; C02F1/68; C02F1/42; C02F1/60; C02F1/68; (IPC1-7): C02F1/60; C02F1/42; C02F1/68

Abstract -- PROBLEM TO BE SOLVED: To provide a method for easily removing silicon contained in

water in a short time without using electric power and an equipment for the same. ; SOLUTION: A water excluding hard water containing silicon is allowed to pass through a container 12 housing obsidian 10 to add active hydrogen to the water. Thereafter, the water which has passed through the above container 12 is allowed to pass through an aluminum cartridge 28 housing tourmaline 32 and a metal 34 therein. Thereby, the silicon contained in the water is separated from the water through adhesion to the inner wall of the aluminum cartridge 28.

COATED SEED

JP2005000036

2005-01-06

Inventor(s): INADA SHINICHI

Classification: - international: A01C1/06; A01C1/00; A01C1/06; A01C1/00; (IPC1-7): A01C1/06; A01C1/00

Abstract -- PROBLEM TO BE SOLVED: To provide a coated seed having an excellent germination performance. ; SOLUTION: This coated seed is characterized in that the coating contains one or more kinds of ore powder radiating far IR light, such as tourmaline ore powder. Such the functional mineral radiates growing far IR light having wavelengths of 4 to 14[μ]m, and thereby promotes the germination of the seed. Many natural minerals contained in the ore promote the growth of crops and reinforce the disease resistance of the crops. The tourmaline ore is a porous ore, and has an electric characteristic that continuously flows a weak electric current. Therefore, the weak electric current stimulates the hair roots of plants to promote their growth. Since containing boron, the tourmaline ore can promote the absorption of water from the hair roots to prevent the fertilizer scorch of the hair roots. Therefore, the coated seed having a high germination rate and an excellent germination performance is obtained.

Tourmaline: Animal and Plant Growth promotion composition

KR20040065199

2004-07-21

Inventor: LEE HAE WANG

Classification: - international: A23K1/16; A23K1/175; A23K1/16; A23K1/175; (IPC1-7): A23K1/16; A23K1/175

Abstract -- A composition for promoting animals and plants containing tourmaline, loess, a loess solution(jijangsu), kaoline and other minerals is provided. It promotes the growth of plants while preventing disease and insect pest of the plants. It also promotes the growth of animals and fishes when fed thereto. CONSTITUTION: The animal and plant growth promoting composition contains tourmaline, loess, a loess solution (jijangsu), kaoline and minerals. The tourmaline is prepared by agitating tourmaline in a solution containing sulfuric acid, nitric acid and oxalic acid, washing and drying in a natural state or at 100deg.C or less. The kaolin is prepared by heating kaolin for 20min at 400 to 500deg.C and grinding to 100 to 325 meshes. The loess solution is prepared by heating loess at 200 to 300deg.C, grinding to 150 to 325 meshes, mixing with purified water in a ratio of 1:20 and then agitating.

DEVICE FOR ACTIVATING MICROORGANISMS BY APPLYING FAR- INFRARED RAYS AND ANIONS TO WATER...

KR20050003633

2005-01-12

Inventor(s): PARK O KYU

Applicant(s): YOOLIM ENVIRONMENTAL CO LTD

Classification: - international: C02F9/12; C02F9/08; (IPC1-7): C02F9/12

Abstract -- PURPOSE: To provide a biological activation device for promoting activation of microorganisms in a sewage and wastewater treatment plant to improve treatment efficiency of sewage and wastewater and completely adsorb and remove odorous gas in exhaust gas generated from sewage and wastewater containing high concentrated organic matter and high concentrated nitrogen and phosphorus at the same time. **CONSTITUTION:** The biological activation device for sewage and wastewater treatment plant comprises a sprinkling pipe(11) into which water to be treated flows; an activation illite ceramic layer(13) which is formed of a special ceramic so that the activation illite ceramic layer emits wavelength of far-infrared rays to generate energy and completely adsorb thus deodorize noxious gas by revolving electrons around the cell when a cell of microorganisms are divided; a permanent magnet layer(14) for generating magnetic force; an activation tourmaline ceramic layer(15) to which a weak electric current is consistently impressed by a magnetic field generated from the permanent magnet so that the activation tourmaline ceramic layer generates anions as a polar crystal that is formed of a special ceramic to have electric polarization itself; a crystalline graphite layer(16) installed on a lower part of the activation tourmaline ceramic layer; and a diffuser(18) into which exhaust gas generated from sewage and wastewater flows.

Method of controlling the growth of microorganism in a liquid with tourmaline crystals

US5569388

1996-10-29

Inventor(s): KUBO TETSUJIRO [JP]

Applicant(s): YUGEN KAISHA KUBO TECHNIC OFFI [JP]

Classification: - international: C02F1/461; C02F1/48; C02F1/50; C02F1/467; C02F1/461; C02F1/48; C02F1/50; (IPC1-7): C02F1/68 - European: C02F1/461B4; C02F1/48; C02F1/50B

Abstract -- A method of electrodepositing removal of ionic material using tourmaline crystal and tourmaline crystal with electrodeposited metal according to the present invention utilize electrodepositing phenomenon whereby to the cathode (negative pole) of tourmaline permanent electrodes, the metallic ion which is anode ion having electric charge of the opposite character thereto is attracted, neutralized, and deposited as a metallic atom to form a metallic coating on the electrode surface. Hereinafter a method of electrodepositing removal of ionic material using tourmaline crystal and the specific structure of tourmaline crystal with electrodeposited metal according to the present invention will be described in detail.

REBALANCING DEVICE FOR ELECTRIC POTENTIAL OF CELL MEMBRANE

WO0202183

2002-01-10

Inventor(s): GIOVANNINI ENORE [IT]

Applicant(s): GIOVANNINI ENORE [IT]

Classification: - international: A61N1/20; A61N1/24; A61N1/34; A61N1/20; A61N1/32; (IPC1-7): A61N1/34; A61N1/20; A61N1/24 - European: A61N1/20P; A61N1/24; A61N1/34

Also published as: ITBO20000391 (A1) EP1299150 (A1) AU6935201 (A)

Abstract -- A rebalancing device for the electric potential of the cell membrane includes a base support (2), constituted by a epoxy resin including isocyanate and toluol, associated with a piezoelectric mineral composition (3) fit for emitting electromagnetic fields at very low frequency. The piezoelectric mineral composition (3) is constituted essentially by 10-30 % of albite, preferably 15 %, 20-40 % of tourmaline, preferably 30 %, 10-50 % of quartz, preferably 30 %, 10-20 % of chlorite, preferably 13 % and 10-20 % of illite, preferably 12 %.

CULTIVATION UTILIZING REDUCED WATER**JP2000262147**

2000-09-26

Inventor(s): KAIHARA TOSHINORI

Applicant(s): KAIHARA TOSHINORI

Classification: - international: A01G7/00; A01C1/00; A01C1/08; A01G16/00; A01G7/00; A01C1/00; A01G16/00; (IPC1-7): A01G7/00; A01C1/00; A01C1/08; A01G7/00; A01G16/00

Abstract -- **PROBLEM TO BE SOLVED:** To make ready to control a time for germination and blooming. **SOLUTION:** This method for cultivation uses controllers for a high-frequency alternating current low voltage and a high-frequency alternating current high voltage and electrode plates connecting to the controllers. The objective cultivation is performed by using reduced water obtained from the devices or mixing the water with an ore containing various mineral components, an electric stone such as tourmaline or various organic mineral, or using lactic acid bacterium bioactive substance, water-soluble chitosan, a high electroconductive activated carbon, an organic fertilizer and manure or an effective microorganism such as actinomycetes, according to the object, utilizing titanium oxide, ceramic using transition element or an ultraviolet light, and further using pyrroligenous acid or a spreader or using an extracted solution from Japanese andromeda, *Arisaema serratum* or a garlic. The objective method is performed by using a water storage tank, utilizing a water-supplying pump or a water discharging pump, using hydroponic equipment of facility of a vinyl house, applying a sprayer or applying sterilized water, according to the culturing method.

Acta Cryst. (1977). A33, Part 6 (November 1977), 927-932 [doi:10.1107/S0567739477002241]**Structural mechanism of pyroelectricity in tourmaline****G. Donnay**

Abstract: Pyroelectricity in tourmaline, known since antiquity, was ascribed by S. von Boguslawski to a charged, asymmetric, anharmonic oscillator based on the Einstein model of a crystal. His predicted values of the pyroelectric coefficient k were in good agreement with Ackermann's measurements in the range 20-

400 K. We have tested Boguslawski's model by refining the structure, at 193 and 293 K, on a sphere of gem-quality elbaite. The pyroelectric effect is due primarily to the asymmetric anharmonic vibrations of O(1), the oxygen atom of point symmetry $3m$ which has a polar environment. Its centre of gravity moves 0.005 Å from 193 to 293 K. It is the only atom with a displacement well above experimental uncertainty. Its large thermal parameters, which are ten times their standard deviation at both temperatures, clearly invalidate the assumption of an ellipsoidal thermal movement. This probably holds for Na and O(2), which also have abnormally large temperature factors, but show no significant displacement.

World Journal of Microbiology and Biotechnology -- Volume 24, Number 5 / May, 2008, Pages 725-731

DOI 10.1007/s11274-007-9529-x

Tourmaline ceramic balls stimulate growth and metabolism of three fermentation microorganisms

He Ni, Ling Li and Hai-Hang Li

(1) Guangdong Provincial Key Lab of Biotechnology for Plant Development and College of Life Sciences, South China Normal University, Guangzhou, 510631, China

Abstract -- Effects of tourmaline ceramic balls on growth and metabolism of *Saccharomyces cerevisiae*, *Lactobacillus acidophilus* and *Aspergillus oryzae* were studied. Treatments with 3, 6, 9 or 12 g of tourmaline ceramic balls in a 50 ml culture showed significant stimulation of the growth of the three microorganisms. In optimal treatments with 12 g of tourmaline balls, the growth of *S. cerevisiae*, *L. acidophilus*, and *A. oryzae* was increased by 34, 32 and 10%, respectively. After 72 h fermentation of *S. cerevisiae*, total carbohydrate content in the culture medium was decreased by 65% and ethanol production was increased by 150%. Total carbohydrate content was decreased by 80% and the pH value was decreased by 0.3, as a result of organic acid production in the medium of *L. acidophilus* after 72 h fermentation. In the case of *A. oryzae*, enzyme activities of protease and amylase were increased by 90 and 31%, respectively, after 96 h fermentation. Results indicated that tourmaline stimulates initiation of growth in the early lag stage and increases production of metabolites at a later stage of fermentation. The strong stimulatory effect of tourmaline on growth, utilization of substrates and production of metabolites in the three microorganisms suggests a potential application in the fermentation industry.

Contact Information Hai-Hang Li

Email: li_haihang@yahoo.com

Tourmaline Composition, Crystallization & Structure

Composition. A complex silicate of boron and aluminum, containing varying amounts of ferrous iron, magnesium, manganese, calcium, sodium, potassium, lithium, hydroxyl and fluorine.

Crystallization. Hexagonal-rhombohedral; hemimorphic. Crystals usually prismatic, vertically striated. A triangular prism, with three faces, prominent, which with the tendency of the prism faces to be vertically striated and to round into each other gives the crystals usually a cross section like a spherical triangle. Crystals are commonly terminated by base and low positive and negative rhombohedrons; sometimes scalenohedrons are present. When the crystals are doubly terminated they usually show different forms at the opposite ends of the vertical axis (homomorphism).

Structure. Usually in crystals. Sometimes massive compact; also coarse to fine columnar, either radiating or parallel.

Physical Properties. Vitreous to resinous luster. Color varied, depending upon the composition. Common tourmaline with much iron is black, sometimes brown. More rarely light colored in fine shades of red, pink, green, blue, yellow, etc. Rarely white or colorless. A single crystal may show several different colors either arranged in concentric bands about the center of the crystal or in transverse layers along its length. Strongly pyroelectric; i.e., when cooling from being heated to about 100° C. it develops positive electricity at one end of the crystal and negative at the other, which enables the crystal to attract and hold bits of paper, etc. Strongly diachronic; i.e., light traversing the crystal in one direction may be of quite a different color or shade of color from that traversing the crystal in a direction at right angles to the first. H. = 7-7.5; G. = 2.98-3.2.

Tests. To be recognized usually by the characteristic rounded triangular cross section of the crystals; absence of prismatic cleavage, coal-like fracture of black variety.

Occurrence. Tourmaline is one of the most common and characteristic minerals formed by pneumatolytic action. That is, it is a mineral that has been formed at high temperatures and pressures through the agency of vapors carrying boron, fluorine, etc. It is found, therefore, commonly as an accessory mineral in pegmatite veins, 01' dikes, occurring with granite intrusions. Associated with the ordinary minerals of granite pegmatite, orthoclase, albite, quartz and muscovite; also with lepidolite, beryl, apatite, fluorite, etc.

Found also as an accessory mineral in metamorphic rocks, such as gneisses, schists and crystalline limestones.

The black tourmaline is of widespread occurrence as an accessory mineral in metamorphic rock. The light colored gem varieties are found in the pegmatite dikes. Famous localities for the occurrence of the gem tourmalines are the island of Elba; in the state of Minas Geraes, Brazil; Ural Mountains near Ekaterinburg; Madagascar; Paris and Auburn, Maine Chesterfield, Massachusetts; Haddam Neck, Connecticut; Mesa Grande, Pala, Rincon and Ramona in San Diego County, California. Brown crystals are found near Gouverneur, New York and fine black crystals at Pierrepont, New York.

Physical properties of tourmaline

by

Darrell Henry

Campanile Charities Professor of Geology and Geophysics at Louisiana State University -- research specialty : metamorphic petrology.

Contact -- (225)-578-2693, fax (225)-578-2302 or e-mail dhenry@geol.lsu.edu .

Address: Department of Geology and Geophysics, Louisiana State University, Baton Rouge, LA 70803.

Chatoyance/asterism

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Darrell Henry is the Campanile Charities Professor of Geology and Geophysics at Louisiana State University whose research specialty is metamorphic petrology. Further details of his professional background are included in an accompanying vita or faculty profile.

To contact Darrell Henry call (225)-578-2693, fax (225)-578-2302 or e-mail dhenry@geol.lsu.edu .
Address: Department of Geology and Geophysics, Louisiana State University, Baton Rouge, LA 70803.



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