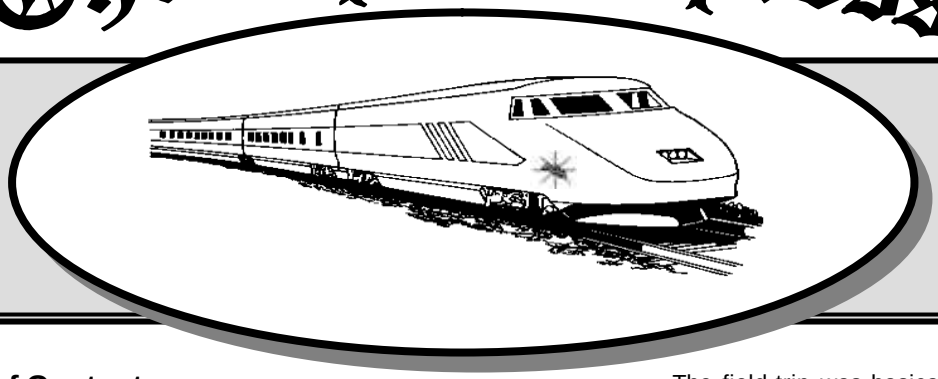
The Opal Express



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Opal Canyon Field Trip Recap

Russ Madsen led four AOS members to the old Barnett Claim at Opal Canyon on March 21st. The group had good weather and had been digging on a promising spot for a few hours when they had to stop.

AOS Members at Opal Canyon. From left right: Tom Chalk, John Robinson, Russ Madsen, Vicki Madsen, and an unknown member.

The field trip was basically nullified when the California State Park Rangers arrived in a rush and announced with a load speaker that no collection is allowed anymore at Opal Canyon. Basically they said you could only take one rock and that no tools were allowed.

This is a drastic change of events that has ended a tradition over 40 years. I don't know what the laws are; however I question the legality of the State of California to prevent collection on what was once a valid claim. My advice to our members is to send a written protest to the California State Parks system to reverse this action. Contacting your congressman is probably a good idea also. The next article was written in the CFMS February newsletter and helps explain what is happening and who to contact. ***The Editor***

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Rockhounding in Red Rock Canyon

By John Martin, CFMS

In younger days, I spent many a weekend at Red Rock Canyon for primitive camping and rock collecting, with study of the Ricardo Formation for which the canyon is famous. There is volcanic ash; copper minerals; fossils (petrified wood, camel, 3-toed horse, etc.). Opal Canyon has opal in a hard volcanic matrix from which I have yet to extract opal without breaking it. Last Chance Canyon Road passes remains of the Dutch Cleanser Mine.

Red Rock Canyon is now a 27,000-acre state park with Hwy 14 running the western edge. Inside park boundaries, no collecting is allowed. On private property in the park, collecting is allowed with written permission from legal owners (on file at the park office). If collecting is done in park boundaries and you receive a visit from Park Rangers, they will confiscate rocks and you'll be lucky if you do not receive a ticket or worse. (See the CFMS website under fieldtrips.) Opal Canyon is now part of the park; that area is closed to collecting. The park seems to expand year after year.

It's been 25 years since a general management plan was established for the original 9,000-acre park. Now California Parks Service is required to revise the General Management Plan. The new general plan will provide direction for the entire 27,000 acres for the next 20-30 years, and public input is being solicited.

Several groups wish to ban vehicular travel inside park boundaries. There are a lot of dirt roads that make a visit to the park an enjoyable

adventure with many geological sights to see. Write to park management to convey your feelings. More can be found on Red Rock Canyon State Park General Plan Revision web- site: http://www.parks.ca.gov/?page_id=25064. Email or mail comments to RedRock@edaw.com or Russ Dingman, California State Parks Tehachapi District, 43779 15th St., W. Lancaster, CA 93534-4754. From the CFMS 2/2009 newsletter, http://www.cfmsinc.org/ .

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Milt Roth to Assume Assistant Show Chairman Spot

Milt Roth has volunteered to help Show Chairman Gene LeVan in his duties as Assistant Show Chairman. Milt has been an active member of the AOS since 2003. Let's give a big thanks to Milt for stepping to help.

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Members Only Website Password

To log onto the website's members only area at: http://opalsociety.org/aos_members_only_area.htm type: Name: "member" and Password: "boulder".

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Gift Donation Request for Clubs

Beth Pelfrey of the Searchers is asking the members of the AOS if they would like to donate a couple of nice jewelry items for two charity auctions. They will have something in the range of $50.00 or less for one and $100.00 or less for the other. The clubs are the Anaheim Arts Council and the Altrusa Club of Anaheim

If you are interested in helping, please bring the donations to the April general meeting or contact Beth directly. Beth's contact information is: Beth Pelfrey, pelfreye@sbcglobal.net, Home: (714) 774 2754, Cell: (714) 615-1670.

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Uranium Gives Opal Its Shine

Nov 22, 2007
By Hamish Johnston

Opal carvings by the artist Daniela L'Abbate: The play of colour of the precious stones can be seen in the carvings. (Courtesy: OTRAD Pty Ltd. S Tranter-Brown and D Sanders).

The beautiful optical properties of the gemstone opal are the result of tiny amounts of uranium present when the stones were formed, say researchers in Australia. They claim that their work could lead to the production of artificial opal and have already shown that the gamma rays given off by the uranium and its radioactive daughters can lead geologists to new underground deposits of the gem.

Opal is made of amorphous silica and this makes it very difficult to find because the gem is usually surrounded by other rocks made of the same material. "Precious" opal differs from the much less valuable common opal in that it contains spheres of silica about 200 nm in diameter that are arranged in a regular superlattice. This gives the gem its famous "play of colour" — different colours that appear when opal is viewed from different angles — which is caused by the diffraction of light in the superlattice.

Now, geologist Brian Senior and physicist Lewis Chadderton have discovered that the superlattice of spheres forms because of the presence of tiny quantities of uranium and its decay products. Using analytical techniques such as electron microscopy and neutron activation analysis along with theoretical models of sedimentation processes, the team have shown that some of the very heavy elements that are made when uranium decays act as a "seeds" for the formation of the silica spheres during sedimentation.

Gamma-ray logging

The uranium also makes precious opal much more radioactive than surrounding silica-based rocks, which tend to have low levels of radioactivity. With this in mind, Senior and Chadderton have adapted a standard tool of oil exploration called gamma-ray logging to create a technique for finding precious opal.

Their technique involves boring a minimum of three holes in a region where the gem is thought to occur. A sodium iodide gamma ray detector is lowered by a winch into each hole and readings are taken every 15 cm. Data are collected on a laptop computer and the system is installed in the back of a four-wheel drive vehicle. If high levels of gamma rays are detected, the data from the three bores are triangulated to locate the centre of the deposit.

The team has used their technique to find new deposits at several locations in Australia. Senior, who runs his own consulting company, believes that the technique could be a boon to Australia's opal mining industry — which, despite producing over 90% of the world's precious opal, he describes as a "cottage industry".

Chadderton, who is at the Australian National University in Canberra, told physicsworld.com that the team are using their insight into opal formation to create artificial gems. As well as being used in jewellery, Chadderton believe that such opals could be engineered to be photonic crystals. These materials can be used to control light in much the same way as semiconductors are used to control electrical currents — something that could make them very useful in fibre-optical communications systems. Senior and Chadderton will report their results in an upcoming issue of The Australian Gemmologist .

About the author

Hamish Johnston is editor of physicsworld.com.

From http://physicsworld.com/cws/article/news/31941

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My Views on Opals with Inclusions or Cracks in Them

By Richard W. Holmes

I have been interested in opals for nearly thirty years - cutting opal, purchasing rough opal, making trips to Quartzite Arizona, and attending the annual Gem Shows in Tucson Arizona. My search for higher quality opal led me to Lightning Ridge Australia, investing in an opal mine and writing books and articles about opal.

If you spend a lot of time studying opal, you will soon find that opal has color and patterns that tell you where it came from. Lambina, has a yellow/light green look to it, boulder opal from Queensland has a brown ironstone backing, Mintabie has a gray background cast to it, Coober Pedy tends to be white all the way through. If you spend a lot of time looking at black opal from the Lightning Ridge area you will soon see differences in that opal too which will tell you what mine field it came from. Much of the opal coming off the Carters fields has a metallic look to it (not all).

In some cases at the Mehi field, Three Mile Gully, and McDonald Six Mile, some of the opal will show inclusions (a change in direction of the opal) or fissures which do not destroy the firmness of the opal but are looked down upon by those buying and selling in the opal market (Figure 1 and Figure 2 are such opals). The kind of lines or inclusions one sees in Figure 2 - is called "cotton" by many people on the Lightning Ridge opal fields. Personally I do not fine these stones and their internal inclusions offensive. In some cases one can get some great color and interesting patterns for a very cheap price and there is nothing wrong with the soundness of the opal.

Figure 1

Figure 2

What I find very perplexing s that some opal I have had in my possession for over six years has only recently began developing hair line cracks. One can only assume that it is the result of the opal beginning to dry out (opal being a hydrous material containing approximately 5% water). (For any technical discussion on opal, I defer to Len Cram and Stephen Aracic and their writings – the Lightning Ridge experts on the subject). This opal, I speak of, has not diminished in color and brilliance. If you have opal with this problem, do not throw it away. There is a product called Opticon resin #224 Fracture Sealer which one can use to seal the cracks and firm up the opal. This is a product used in the opal business that not a lot of people want to talk about – it works. The experts can tell an opal has been treated with this sealer. Most serious sellers in the market do not like to deal with treated opal. Here again if you are honest with those you deal, I see no reason why it can't be sold. Obviously the price should reflect the fact that it has been treated.

Figure 3

In purchasing opal, like anything else, "let the buyer beware." One disturbing case where I have seen resin sealer used and not disclosed was by a seller of Ethiopian opal. I looked at his rough and finished material and then said to him: "You're having to cook it aren't you?" (Cook meaning resin filling the cracks). He got a big grin on his face and said: "Yes, I have to cook it twice, once before I cut it and again after it has been cut." What I found disturbing was that he did not disclose this fact to his customers as well as offering finished pieces for the same or similar prices as top quality Lightning Ridge black opal. So, if you buy Ethiopian chocolate opal make sure you examine it very carefully.

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Pair to Resolve the Great Opal Debate

By Jill Rowbotham
January 14, 2009

LOVE it or loathe it, high-quality opal -- hydrated silicon dioxide - is regarded as Australia's own semi-precious stone.

But there are significant gaps in knowledge about what is a valuable commodity, supporting an industry worth up to $1 billion annually and producing 95 per cent of the world's commercial supply.

The big debate is about how it is formed, according to University of Sydney geoscientists Patrice Rey and Adriana Dutkiewicz.

Dr Rey became aware of this about three years ago. "The Lightning Ridge Miners Association invited me to go and look at the mines to see whether the syntectonic model (of formation) was correct," Dr Rey said. "I went there thinking there was no way that model can work, but it turned out this was exactly what happened (at Lightning Ridge)."

The syntectonic model holds that opal forms rapidly within sub-tectonic extensional fractures filled with hydrothermal fluids from deep within the earth's crust, super-saturated with silica.

The key, said Dr Rey, was that the pressure applied be sufficient to fracture the reservoir containing the viscous fluid, but not enough to breach the reservoir so that the fluid is lost.

The rival, much older theory, called the deep weathering model, holds that precious opal has been formed about 20m to 40m underground, when feldspars and clays mixed with surface water to produce a silica-saturated fluid trapped in open fractures and cavities above impermeable clay. When the water evaporated, precious opal was formed.

As Dr Rey realized after visiting the central northern NSW town, neither theory had been investigated properly, a situation that could be remedied now he and Dr Dutkiewicz have a $250,000, three-year Australian Research Council grant.

"I couldn't believe we knew next to nothing about opal. It's a national icon," Dr Rey said.

Said Dr Dutkiewicz: "The interesting thing is when we were writing the proposal together we couldn't find any peer-reviewed papers on Australian opal, so we had very few references because so little has been done."

The pair characterized the opal mining industry in Australia as still essentially a cottage industry. There are 8000 leases and about 2500 miners, many of whom are self-educated geologists who could do with some guidance in defining areas for new exploration. Another mystery is the age of the deposits, roughly placed during the late Cretaceous-early Tertiary period, so up to 75 million years ago.

"It's hard to date," said Dr. Dutkiewicz. "One way is by uranium series dating but Australian opal contains very little uranium. According to some reports, some opal may be as young as tens of thousands of years old."

The pair are planning trips to Lightning Ridge and other opal sites such as those in South Australia in the Coober Pedy area, but they will be dealing with low-grade opal.

"We can't afford to grind up and examine the semi-precious opals," Dr Dutkiewicz said.

Article from: The Australian
From http://www.theaustralian.news.com.au/story/0,,24909098-12332,00.html?from=public_rss

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Types of Opal

By Wayne Farley
09/26/06

Opal derives from the Latin opalus, meaning precious stone. Opal is an amorphous (i.e. noncrystalline), hydrated silicon dioxide (SiO_2 * nH_2O), that contains about 3-15% H_2O by weight. The hardness of opal depends on its water content, and varies from 5.5-6.5, Water content can be quite variable, even within a single piece. The relatively high water content of most opal leaves it susceptible to damage by rapid or extreme changes in temperature. Opal mined from a damp or wet source, or that mined from volcanic host rock is more prone to dehydration than that mined from a dry source or from a sedimentary host rock. Dehydration may result in cracking (referred to crazing or checking) that greatly diminishes its value. The two major classes of opal are fire opal & common opal. A wide variety of names has been, and continues to be used, to describe various types of opal. Most have their basis in three important attributes; 1) body color; 2) transparency; 3) character of play-of-color and colors present. The following names are in common use:

- Black Opal- black, dark green, dark brown or other dark body color with vivid play-of-color. Often synonymous with "Australian Opal" or "Coal Black".
- Crystal Black Opal - Black opal that is transparent to translucent.
- Crystal Opal - transparent to translucent, having no body color but strong play of color.
- White Opal - translucent to opaque, with white body color and play-of-color. Once referred to as "Hungarian Opal".
- Boulder Opal - opal with play-of-color that is present in a matrix of dark brown or black sandstone (ironstone).
- Transparent or Semitransparent Opal - transparent opal with slight to no play-of-color with a body color that is yellow, orange, brown, red or colorless. Colorless called "Water Opal", "Jelly Opal", "Hyalite", "Contra-luz", "Hydrophane". Yellow, orange and red body color referred to sometimes as "Fire Opal" or "Cherry Opal". This material is commonly faceted rather than cabachoned.

- Common Opal ("Potch") - translucent to opaque, having nearly any body color, but no play-of-color. Known by a myriad of names; e.g. Matrix Opal, "Geyserite", "Wood Opal", etc.. "Common Opal" contrasts with "Precious Opal" in the categories above.

Fire Opal is unique among all gems because of its source of color (diffraction). The source of the play-of-color in fire opal is the semi periodic arrangement of the spheres of hydrated SiO2, whose centers are spaced at about the wavelength of visible light. These serve as a diffraction source for refracted and reflected light. Finer quality opal (that exhibiting great play-of-color) generally has more H_2O than lesser quality material. Commercial deposits of Fire Opal have been found in Arizona, at the Spencer Mine in Idaho, Louisiana, the Virgin Valley in Nevada, and at Opal Butte in Oregon.

Common Opal, which has a random arrangement of SiO2 spheres, has no diffraction play of colors. However, common opal can be attractively colored yellow, brown, green, blue or pink by other trace elements or minerals. Common opal often forms petrified wood and is found in all of the western states.

Formation of Opal: Opal is formed at low temperatures (<200°C) by the precipitation of colloidal silica from groundwater moving through siliceous rocks in arid regions. Colloidal silica can derive from the following:

Alteration of siliceous sedimentary rock (quartz sandstones) along cracks and cavities to deposit opal crusts or nodules - Australia

Alteration of siliceous rhyolite volcanic rocks – Brazil, Mexico, Idaho

Concentration of silica gel derived from marine organism in evaporating sea water; replacement of skeletal remains and shells by opal - Australia

Blue Grouse Opal Site. The Blue Grouse Opal Site, claimed by BGMS, is 99.99999% common blue or white opal occurring in fractures in porphyritic rhyolite flows. The visual phenocryst crystals in the rock are biotite. Occasionally, specimens have been found with pin point size flashes of fire opal. Rumor states that many years ago, the original claim holder found a fist size specimen full of fire. However, no one in our club has ever seen it. Jo Farley says that she has seen a couple of marble size specimens of fire opal that the Kaisers from Salmon, Idaho have found on the Blue Grouse Claim.

On Sept. 8, 2006, the BGMS hired an excavator and operator to dig on two areas of the Blue Grouse Claim. Ralph Luther spent the day at the Claim working with the excavator operator. Several people from the BGMS club searched the diggings for fire opal on Sept. 9th, 10th, and 11th. Jo Farley has the list of participants. On the 9th, the diggers were Robie Flynn, Bonnie Klein, Gayla Kaiser, Wes Williams, Jerry & Janice Sommers, Jo & Don Farley, and Ralph Luther. On the 10th, the diggers were Janet & Tim Huntley, former members Jim & Karen Rayner, Jo & Don Farley, and Penny & Ralph Luther. On the 11th, the diggers were Larry Jones, Harvey Sharp, Anna & Marvin Horner from Salmon, Jerry & Janice Sommers, Joe & Gayla Kaiser, Don & Jo Farley, Ralph Luther, and Wayne & Dan Farley. I, Wayne Farley, and my son Daniel searched on Sept. 11; during daylight for fire opal, and later that night with a long wave ultraviolet light for fluorescent specimens. We knew that the blue opal was fluorescent from previous years of collecting. I found a couple of pea size specimens of blue opal during the day search that had pin point flashes of color by examining numerous specimens with a 10 power hand lens. I then later examined these specimens at home with my 10 to 100 power microscope. One blue opal specimen had true green diffraction fire. The other specimen had a rainbow of colors from a fracture prism of opal. Samples of fire opal and fluorescent opal from the Blue Grouse and other areas were shown at the Sept. 26 club program.

Idaho Opal. In Idaho, opal is the second largest contributor to the total value of gem material produced. The varieties produced include precious (white and pink), yellow, blue, pink, and common. The Spencer opal mine, the largest privately owned gem stone producer in the State, is the major producer of opal. At Spencer the precious opal occurs as one or more thin layers within common opal partially filling gas cavities within a rhyolite-obsidian flow. About 10% of the material is thick enough to cut into solid gems; the remainder is fashioned into doublets and triplets. The Spencer Mine is the source of pink common opal and pink precious opal. High silica volcanic ash deposits that derived from acid rock magma are believed to have been the source of the silica in Idaho's opal deposits.

Differentiating Volcanics:

Acid magma produces Granite if cooled slowly, Rhyolite if cooled rapidly in surface flows, and Obsidian if cooled very rapidly. Basic flow rocks produce basalt, and are the chemical equivalent of Gabbro. Basic rocks are relatively low in silica and are not good sources for colloidal silica for producing opal. Volcanic rocks can be differentiated by their chemistry and physical characteristic as shown in Figure 1.

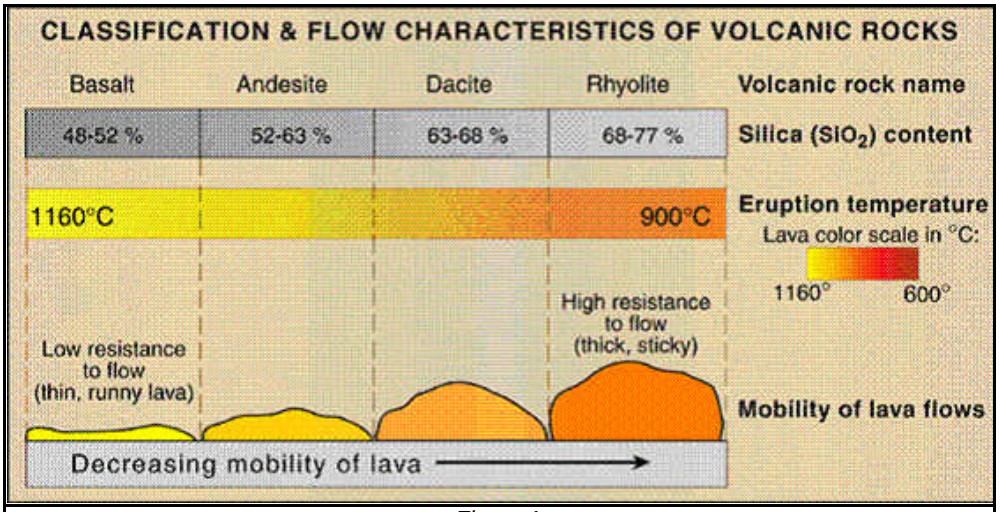

Figure 1.

Illustration by J. Johnson, USGS

Basalt is the aphanites mineralogical equivalent of the coarse grained basic rock Gabbro. It is composed primarily of calcium plagioclase feldspar, pyroxene, minor olivine, and does not contain quartz or other light-color minerals. The overall color is dark grey to greenish black. It commonly has numerous bb to pea sized gas bubbles, which may be open or filled with secondary minerals. Basalt is never a source rock for opal, but rarely may be a recipient. Good examples of Basalt are the Columbian River Basalts in eastern Washington and Oregon, or Craters of the Moon in southern Idaho.

Rhyolite is the aphanites mineralogical equivalent of the acid rock Granite; and at times is porphyritic, meaning that it has scattered visual phenocryst crystals of quartz, sanidine (a potassium feldspar), biotite, and amphibole. Rhyolite colors vary from gray to reddish. The reddish tones are due to potassium feldspar porphyritic crystals in the rock. Rhyolites are generally found as flows, sills, and dykes, and occasionally as plugs. They never form widespread deposits because the viscous lava can only flow for short distances. Owing to their hardness and resistance to weathering, rhyolites often form jagged, angular, upstanding rock

masses, and these features combined with their pale color make rhyolites relatively easy rocks to identify in the field. Acid volcanic rocks are more explosive than basic volcanic rocks, and rhyolite type rocks may also form as welded volcanic ash or welded volcanic breccia. These latter two are more susceptible to diagenesis of silicate minerals, and thus more favorable as a source for opal formation.

Fluorescent Opal. Opal fluoresces in a variety of colors under ultra violet lights. Amongst the brightest is the clear botryoidal masses of Hyalite Opal from Spruce Pine, N. C. that fluoresce a bright green.

In Montana, about 25 miles south of Bozeman, fine Hyalite Opal and beautiful reddish-yellow translucent common opal occurs near the summit of Mount Blackmore, Gallatin County. This opal was discovered by geologist Albert Peale in 1872. One of the nearby peaks, Hyalite Peak (10,110 feet) has been named after the occurrence. The opal from this locality was once seriously considered for gem purposes and the name blackmorite proposed for it. A couple of pieces were for sale at one of the gem & mineral shows this summer.

I, Wayne Farley, also discovered this summer that common opal seams in the Crystal Park matrix fluoresces a bright green. I intend to follow this up next summer for good specimens. The fluorescent green in opal under the ultra violet light is due to a few PPM of uranium.

From the newsletter or the Bitterroot Gem & Mineral Society
PO Box 942, Hamilton, MT 59840-0942
http://www.wilderphoto.com/BitterrootGMS/opal.htm

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KYOCERA Unveils One-of-a-Kind "Kyoto Opal"

Feb. 10, 2009

Opal Material Displayed at Paris ModAmont Clothing & Accessory Supply Fair

KYOTO, Japan--(BUSINESS WIRE)--Kyocera Corporation (NYSE: KYO) (TOKYO: 6971) today announced that it is unveiling its "Kyoto Opal" — the unique opal material that the company has developed — for the first time outside of Japan at one of the world's largest trade fairs for trimming and supplies for fashion and design, ModAmont, in Paris, France from February 10th through the 13th.

Samples of Kyocera's Kyoto Opal, and clothing accessory buttons made from the same material will be on display in the Shindo Senikogyo Co., Ltd. booth at the trade fair.

Kyoto Opal is the name given to the opal material that Kyocera has developed, which up until this point has been known outside of Japan simply as man-made color opal. Cultivated with a quartz-grain structure that is identical to naturally occurring opal, the Kyoto Opal material has a unique aesthetic quality that cannot be duplicated with molded resin-based products. Due to special staining techniques, Kyocera has been able to realize a variety of rich and subtle hues and tints. Furthermore, by surmounting the inherently brittle characteristics of naturally occurring opals, which tend to split and crack, it is possible to cut the Kyoto Opal into diverse shapes. By integrating the traditional Japanese hikihaku technique of manipulating hard objects for kimono designs with a 0.2 mm thin sheet of Kyoto Opal, it is possible to bend a sheet of the opal material composite, thus creating high expectations for use in various applications.

Kyocera decided on the name Kyoto Opal in part because the material was created in Kyoto, Japan, as well as to familiarize people around the world with the opal by associating it with the internationally known, historically rich city.

About ModAmont

ModAmont is a trade fair for fashion and clothing design supplies which is held twice a year to coincide with the world-renowned Paris Collection fashion events. As a parallel exhibition to the Premiere Vision — the original textile trade fair — suppliers from clothing and accessory related industries come from all over the world to display their buttons, buckles, fasteners and other fashion related materials. At last year's fall ModAmont trade fair, more than 300 merchants exhibited their goods. With many influential designers and buyers from the fashion world assembled all at once for the Paris Collection, it is said that at these events one can get a sneak peek at which design materials will be in vogue in the coming year.

About KYOCERA

Kyocera Corporation (NYSE:KYO) (TOKYO:6971) (http://global.kyocera.com), the parent and global headquarters of the Kyocera Group, was founded in 1959 as a producer of fine ceramics (also known as "advanced ceramics"). By combining these engineered materials with metals and plastics, and integrating them with other technologies, Kyocera has become a leading supplier of solar power generating systems, telecommunications equipment, laser printers, copiers, electronic components, semiconductor packages, cutting tools and industrial ceramics. During the year ended March 31, 2008, the company's net sales totaled 1.29 trillion yen (approximately US $12.9 billion).

Contacts

KYOCERA Corporation (Japan)
Taishi HIRAO, +81-(0)75-604-3416
Corporate Communications
webmaster.pressgl@kyocera.jp
Fax: +81-(0)75-604-3516
Permalink:
http://www.businesswire.com/news/home/20090210005701/en

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Correction of Picture of Holmes

Bob Lisle	*Richard Holmes*

In the April 2009 Opal Express, I posted a picture of Richard Holmes, the author of the article on diamonds in Lightning Ridge. Well, the photo was actually of Australian Miner Bob Lisle. Here is the correct picture of Richard Holmes. Now you tell me, don't they look alike? I had both pictures – I thought they were the same person! ***The Editor***

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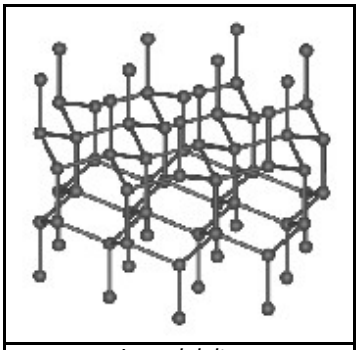
What is the Hardest Metal?

The hardest known metal alloy and the hardest known metal in general, is a type of carbon steel, Alloy 1090. With a tensile strength of .84 GPa (122,000 psi) and a yield strength of .64 GPa (67,000 psi), carbon steel is surpassed in hardness only by very hard nonmetals, such as ruby, diamond, or aggregated diamond nanorods.

The best high-carbon steels rate an 8 on the Mohs scale of hardness, relative to ruby at 9 and diamond at 10. The hardest metals are still somewhat soft in comparison to the strongest nonmetals, based on the strongest bonds in chemistry, the sp2 bond between carbon atoms.

High-strength carbon steel goes through a process of tempering and annealing to make it harder. After this process is complete such steel is called strengthened steel, the hardest metal available. Carbon contents as great as 2% may be present in the hardest metal.

Another one of the hardest metals is tungsten carbide, used in both the military and for top-shelf sports equipment. Depleted uranium, the metal of choice for tank shells, is not harder than tungsten carbide or carbon steel but it is more dense, which is preferable for projectiles. The strongest single element is osmium, used for high-grade pencils because it can withstand the force of writing, even with a tiny tip. Osmium is $400 per troy ounce, much more expensive than the alloy-based metals.



Lonsdaleite

Most carbon steels melt at 2800 °F (1537 °C), and osmium at 5491?°F (3033?°C). Iridium and titanium are also sometimes incorrectly called the hardest metals. Titanium has been used to build the world's deepest-diving submarines, however.

Sometimes very hard metals, like carbon steel, are undesirable because of their other properties. Carbon steel, for instance, is notoriously corrosive. Just because it is the hardest metal does not necessarily mean that it is the most useful for every job.

From http://www.wisegeek.com/what-is-the-hardest-metal.htm

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Harder than Diamond?

Feb 14, 2009

For millennia diamonds have been well established as the hardest material in nature. Then, two years ago, a composite material containing the mineral wurtzite BN was shown to have the same resistance to indentation as diamond.

Now, theoretical work by researchers in China and the US suggests that pure wurtzite BN is significantly harder than diamond. They also predict that Lonsdaleite — with a structure closely related to wurtzite — could be transformed under pressure to become 58% harder than diamond, a new world record (PRL:102.05503).

Hong Sun of Shanghai University and his colleagues report that the very act of indenting wurtzite-BN can force it to undergo a phase transformation into a new crystalline structure with super strength.

A new phase

A material's hardness is usually taken as a measure of its resistance to external forces. The classic field test is to determine relative "indentation hardness" by crunching together two materials; the harder does the indenting and the weaker gets indented. The fact that diamond has always won these battles is related to its strong, stable carbon lattice, which most commonly takes the form of an octahedron.

Two years ago diamond finally met its match when a small quantity of composite containing the little known wurtzite BN (w-BN) was shown to have the same level of indentation hardness as diamond. Because all other minerals in the composite were known to be significantly weaker than diamond, it led researchers to believe that w-BN may be may possess hardness superior to diamond.

Sun and colleagues focused on w-BN's hexagonal crystalline structure, and its stress response to indentation loading. This paid off when their calculations showed w-BN to undergo a structural phase transition when subject to high pressures. The crystal volume remained unchanged but a "bond flip" led to a much increased resistance to indentation.

Armed with this theoretical explanation, the researchers then extended their theory to the related mineral Lonsdaleite. They predict that this naturally-occurring material can be compressed into an even stronger crystalline lattice that 58% more resistant to indentation than diamond.

A machinist's best friend?

Given the usefulness of diamonds for industrial cutting but their high prices, a lot of practical and theoretical research has gone into finding materials that are as hard and thermally stable as diamond. Lonsdaleite certainly has the strength, according to this new research, but the main problem is its scarcity in nature. "Lonsdaleite and w-BN exist in these metastable structures but they need to overcome the very high potential barriers to transform," said Sun.

From http://physicsworld.com/cws/article/news/37798

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Nano-Material is harder than Diamonds

Aug. 30, 2005
By Will Knight

A material that is harder than diamond has been created in the lab, by packing together tiny "nanorods" of carbon.

The new material, known as aggregated carbon nanorods (ACNR), was created by compressing and heating super-strong carbon molecules called buckyballs or carbon-60. These molecules consist of 60 atoms that interlock in hexagonal or pentagonal shapes and resemble tiny soccer balls.

The super-tough ACNR was created by compressing carbon-60 to 200 times normal atmospheric pressure, while simultaneously heating it to 2226°C.

The properties of the resulting material were then measured using a diamond anvil cell at the European Synchrotron Radiation Facility in France. This instrument squeezes a material between two normal diamonds, enabling researchers to study it at high pressure using synchrotron radiation - extremely intense X-rays which reveal the material's structure.

The researchers found their ACNR to be 0.3% denser than ordinary diamond and more resistant to pressure than any other known material.

Industrial applications

"Our material actually scratches normal diamonds," says Natalia Dubrovinskaia, of the University of Bayreuth, in Germany, who led the research. "We were very excited, and glad."

While an ordinary diamond gets its hardness from the strong molecular bonds between each of its atoms, ACNR derives its strength from the fact that it is formed from interlocking nanorods, the researchers say.

Dubrovinskaia told New Scientist the material could have a wide range of potential industrial applications. As it is stable at very high temperatures, she says it could be better than normal diamond for deep drilling and polishing abrasive materials. She also believes it will be easy to mass produce the super-tough material. "It's a very reproducible result," she adds.

Journal reference: Applied Physics Letters (vol 87, 08, p 3106)

From http://www.newscientist.com/article/dn7926

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Digging for Opal in the Black Rock Desert

Here is a good discussion of digging for opal in Virgin Valley, Nevada from http://rockhoundsoforegon.tribe.net. Posted From 8/13/07 to 7/20/08.

Sporeboy

This year on the way to the burn, my partner and I are stopping for a couple of days to noodle through the rainbow ridge tailings, hopefully dry bank this year.

You have to pay a $70 fee, but you keep what you find, and I do not now anyone who has not found at least one good chunk of opal rough worth ever so many times the digging fee.

The opal from the Black rock is a mostly wood opal pseudomorphs with a high H_20 content, which means that 90% of the opal you find if for specimen only, unless you seal the cracks with Opticon. But the dry banks contain opal that has stabilized. My dream is to find a huge chunk of black broad flash crystal opal, then chip off pieces and give then away to the rock hounds I know are going.

I have been working on several Koroit opal pendants to give away as well. I hope to run into Chris so I can give him an extra special piece I have been working on for weeks.
Anyone else been to Rainbow ridge, or any of the surrounding opal mines? 60 miles east of Lakeview!
Namaste

Snowlover
I haven't been to any of the mines but I have found a few specimens nearby. The quality is not all that great but I have seen some stuff from the rainbow ridge that looks nicer.
Happy hunting, see ya on the playa.

FreakFactor
You must show me what you find. I would love to hear more. BTW, I bought a 6" wheel Genie and have been making cabs out of "black rock" Basalt collected last year for gifts this year. They look pretty good.

Curt
YES, please let us know. I would also like to know if you could Google a map for us as I've been wanting to go to this place you speak of on the way to the Burn or on the way back for years now. Just never got around to finding out where it was and how much. If you could do that, that would be cool!
I won't see you at the burn this year though. Next year, definitely!

Sporeboy
This is the link to the Royal Peacock Mine map where we are going.
royalpeacock.com/nevadamap.htm
This is the link to the Bonanza mine, which is in the same valley. This mine is mostly dry bank opal that has stabilized, it is a great place to always find rough, though most will craze.
www.bonanzaopals.com/pics.htm

Curt
Thank you so much! "Craze"?

Sporeboy
Craze is the term used in lapidary work to describe the fine cracks that can spread through opal and many other precious stones when the water content is suddenly reduced in the opal. This can happen within minutes in a lot of the crystal Oregon opal, and can also happen very easily during the grinding-sanding-polishing phase as well.
The Nevada opal dug from the wet banks has very high water content, but the brightness and patterns that are found make the 10% that stays intact well worth it since the black opal rivals any Lightning Ridge Australian opal. The trick to getting low water content, as well as the high quality is very simple.
The whole Northwest section of Nevada is opal bearing, but what most people don't realize is that you have options as far as where you search. There are lower wet banks that the mine owners doze out for noodling, and you will find opal, and sometimes quit a lot, but again it will be prone to crazing. When you go to any of the mines in this area, email first and ask if there is dry bank tailings, if they say yes, go for it. You will not find nearly as much opal, but it will be stable since the opal has equalized over millions of years.
I hope to see you at the event, so soon, and still so much to do...

DAWNEL
Yes I have heard about those places and want to go so bad! My hubby and i might go soon!!! For Valentines he bought me a ring that is old and has a very rare blue opal! I love opals!!!! Happy hunting and hope to see you there!

Curt
And somewhere in the recesses of my mind, I knew that. Thanks though. :-)

AlaskaStever
Has anyone put opal specimens from this location under a longwave or shortwave ultra-violet lamp to see if they fluoresce? Most of the opalized wood I have seen from Nevada (Virgin Valley?) is strongly fluorescent, glowing a very specific color of green under UV. Same color as the "green ghost" in the kid's board game of that name from way back when, if you recall it.

Sporeboy
In Coober Pedy and other opal mining areas around the world, the mine run is dumped into a black light room where the opal glows among the non-opal potch. All opal will fluoresce to a degree.
The virgin valley opal glows very brightly due to Uranium content, and there is evidence that this very low level radiation is in all opal species, though the relationship is not understood.
There is a project in Australia's Lightning Ridge mining area that is using very sensitive equipment to read the micro levels of this radiation in order to narrow the search for test holes.
Ahhhh, I love things that glow.

Suzan
In answer to the question: Has anyone put opal specimens from this location under a longwave or shortwave ultra-violet lamp to see if they fluoresce? Most of the opalized wood I have seen from Nevada (Virgin Valley?) is strongly fluorescent.
It is orange, the petrified wood from Virgin Valley. The opalized wood IS bright green. I only found a few pieces of it. The opalized wood from Virgin Valley is the most vivid of all my fluorescent rocks.
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April 2009 Gem & Mineral Shows

3-5--BAKERSFIELD, CA: San Joaquin Valley Lapidary Society; 6th annual show, "Rock and Gem Rendezvous 2009"; San Joaquin Valley Lapidary Society; Kern County Fair Grounds, 1142 S. P St.; Fri. 9-8; Sat. 9-5, Sun. 9-5; free admission; indoor/outdoor show, rocks, gems, fossils, beads, lapidary supplies, hourly drawings, silent auction, spinning wheel, raffle; contact Lew Helfrich, (661) 323-2663; e-mail: lewsrocks@bak.rr.com

3-5--EUREKA, CA: 8th annual show, "Lost Coast Jewelry, Gem, Bead & Mineral Show"; Kasey Enterprises; Redwood Acres Fairgrounds, 3750 Harris St.; Fri. 12-7, Sat. 10-7, Sun. 10-5; adults $3, seniors and students free Fri., half-price Sat. and Sun., children 12 and under free with adult;; contact Kasey Enterprises, P.O. Box 2927, Mc Kinleyville, CA 95519-2927, (707) 839-1358; e-mail: kaseyent@sbcglobal.net

3-5--VISTA, CA: 1st annual tailgate; San Diego County Council; Antique Gas & Steam Engine Museum, 2040 N. Santa Fe Ave.; Fri. 9-5, Sat. 9-5, Sun. 9-5; free admission; lapidary, rocks, gems, books; contact Ray Pearce, (760) 726-7570

4-5--MARIPOSA, CA: Show; CA State Mining and Mineral Museum, Mariposa Gem & Mineral Club; Mariposa County Fairgrounds, 5005 Fairgrounds Rd.; Sat. 10-6, Sun. 10-4; free admission; gems, minerals, jewelry, crafts, mineral exhibits, children's activities, guest speakers, silent auctions, mining and mineral museum; contact Dianne Bereschagin, P.O. Box 1192, Mariposa, CA 95338, (209) 742-7625; e-mail: mineralmuseum@sti.net

11-12--PARADISE, CA: 55th annual show; Paradise Gem & Mineral Club; Paradise Elks Lodge, 6309 Clark Rd.; Sat. 10-5, Sun. 10-4; adults $1, children free; raffles, demonstrations, auctions, exhibits, youth activities; contact Carol Eggleston, 3745 Cosby Ave., Chico, CA 95928, (530) 343-0894; e-mail: cjeggy@chico.com

17-19--ALPINE, TX: 20th annual show, "Treasures of West TX"; Chihuahuan Desert Gem & Mineral Club; Highland Events Center, Hwy. 90, across from Sul Ross State University; Fri. 9-6, Sat. 9-6, Sun. 11-5; free admission; 2nd annual Collegiate Geology "Box of Rocks" Competition, Kids' Corner, door prizes, rock food table, Rock For Life dance, Grub Run Rally, field trips (Woodward Ranch, Shafter Silver Mine, Red Rock Ranch); contact Donna Trammel, (432) 426-2924; e-mail: rocklady2002@sbcglobal.net

17-19--SAN DIEGO, CA: Show; Gem Faire Inc.; Scottish Rite Center, 1895 Camino del Rio S.; Fri. 12-7, Sat. 10-7, Sun. 10-5; $5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

17-19--SAN JOSE, CA: CFMS Show and Convention, "Nature's Showcase"; Santa Clara Valley Gem & Mineral Society; Santa Clara County Fairgrounds, 344 Tully Rd.; Fri. 9-5, Sat. 10-5, Sun. 10-5; admission $6; 60 dealers, kids'

area, demonstrations, Ice Age fossil display, 6,000 lb. jade boulder, exhibits, jewelry, gems, beads, minerals, fossils, gold panning demonstration; contact Frank Mullaney, P.O. Box 54, San Jose, CA 95103, (408) 265-1422; e-mail: info@scvgms.org; Web site: www.scvgms.org

17-19--STOCKTON, CA: Show , "The New Jewelry, Gem, Bead & Mineral Show"; High Sierra Investment Group Inc.; San Joaquin Co. Agritourism Conference, 2101 E. Earhard Ave.; Fri. 12-6, Sat. 10-7, Sun. 10-5; adults $6, seniors and students $3, children free; door prizes, gold panning specialist and certified gemologist and appraiser on hand; contact High Sierra Investment Group Inc., 20385 Pahute Rd., Apple Valley, CA 92308, (760) 961-2728; e-mail: GEFisher39@aol.com; Web site: www.HighSierraInvestments.net

18-19--LANCASTER, CA: Show; Antelope Valley Gem & Mineral Club; Lancaster High School, 44701 32nd St. W; Sat. 9-5, Sun. 9-5; free admission; dealers, tailgaters, raffle drawing, silent auction; contact Jules Ficke, (661) 943-5157; e-mail: av_gem@yahoo.com; Web site: www.geocities.com/av_gem

24-26--SANTA ROSA, CA: Show; Gem Faire; Sonoma County Fairgrounds/Grace Pavilion, 1350 Bennett Valley Rd.; Fri. 12-7, Sat. 10-6, Sun. 10-5; admission $5 (weekend pass); contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

25-26--ELMA, WA: 41st annual show, "Earth's Treasures"; Grays Harbor Gem & Geology; Grays Harbor County Fairgrounds, 32 Elma-McCleary Rd.; Sat. 10-5, Sun. 10-5; contact, Gary Emberly, (360) 533-6196; e-mail: melissa624@hotmail.com

25-26--SANTA CRUZ, CA: Annual show; Santa Cruz Mineral & Gem Society; Santa Cruz Civic Auditorium, corner of Center St. and Church St.; Sat. 10-5, Sun. 10-5; adults $3; Treasure Wheel, demonstrations, more than 20 dealers, gems, minerals, beads, jewelry, fossils; contact Dean Welder, P.O. Box 343, Santa Cruz, CA 95061, (408) 353-2675; e-mail: wdeanwelder@yahoo.com; Web site: www.scmgs.org

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Editor-Jim Pisani
Please address all inquiries and exchange newsletters to:
The Opal Express C/O
Jim Pisani
P.O. Box 4875
Garden Grove, CA 92842-4875
E-mail: editor@opalsociety.org

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A Renewal Grace Period of two months will be provided. If your dues are due now you will receive two additional issues of the newsletter. Please note, however, that as the system is now set up, if your renewal is not received you will be AUTOMATICALLY dropped from membership thereafter. It is your responsibility to assure your dues are current.

Thank you,
The Editor

The Opal Express
American Opal Society
P.O. Box 4875
Garden Grove, CA 92842-4875

Volume #42 Issue #4
April 2009

TO:

April 9th - Opal Cutting Video By Greg Pardee

Some Topics In This Issue:

Important Dates:
April 7th - Board Meeting

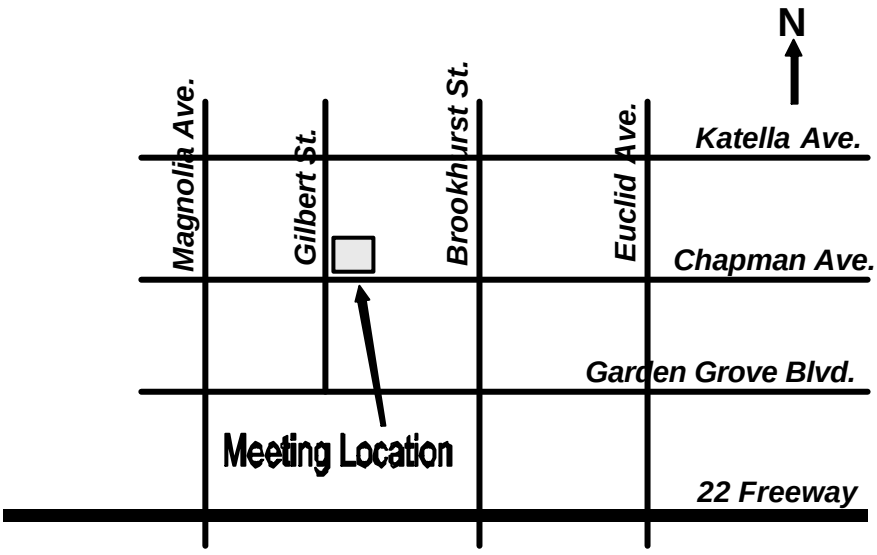
April 9th -.General Meeting. A video on Cutting Black Opal by Greg Pardee will be presented

— *GENERAL MEETINGS* —

2nd Thursday of the Month
7:00 pm - 9:00 PM

Garden Grove Civic Women's Club
9501 Chapman Ave.
Garden Grove, CA 92841
(NE corner of Gilbert & Chapman)

MEETING ACTIVITIES
Opal Cutting, Advice, Guest Speakers, Slide Shows, Videos, Other Activities



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Jim Lambert	President	(714) 891-7171	email: upnstcths1@yahoo.com
Stan McCall	Vice-President	(714) 220-9282	email: custom-creative@earthlink.net
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Jim Pisani	Editor & Webmaster	(714) 815-4638	email: editor@opalsociety.org
Gene LeVan	Show Chairman	(562) 621-1805	email: fineblackopal@sprynet.com