

GEM NEWS

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COLORED STONES

Green-fluorescing emerald from Coscuez. An unusual emerald crystal from Coscuez, Colombia, was brought to us by Mr. Ron Ringsrud for examination. The report that follows was prepared by Dr. Emmanuel Fritsch, a GIA research scientist.

The crystal, about 1.5 cm long and 0.8 cm in diameter, weighs 7.94 ct. Its refractive indices (1.578 and 1.585) and specific gravity (2.72 by the hydrostatic method) are typical of material from Colombia (see *Gems & Gemology*, Summer 1986, pp. 67–79, for an in-depth article on Coscuez emeralds). The optical absorption spectrum is characteristic of that of emerald, with chromium lines around 680 nm visible with a hand spectroscope; although some features strongly suggest the presence of vanadium (Carol Stockton, pers. comm.). The specimen's external structure is the result of parallel intergrowth of a bundle of smaller (1–5 mm in diameter) crystals. Strong color zoning can be seen both parallel and perpendicular to the optic axis. The color decreases from one end (dark green) to the other (colorless) of the crystal; when viewed down the optic axis, the stone reveals a slightly yellowish green core about 5 mm in diameter surrounded by a darker rim of the same hue.

The most interesting phenomenon, though, is the weak green fluorescence of the emerald when exposed to long-wave ultraviolet radiation (also very weakly visible with short-wave U.V. radiation). Microscopy revealed that the fluorescence was not concentrated in cracks and so could not be related to the presence of oil. Moreover, the intensity of the fluorescence clearly correlates with the intensity of the green coloration. The emission spectrum resolved on an AMINCO SPF-500 fluorescence spectrometer revealed a band at 467 nm and a very broad band centered around 510 nm, probably responsible for the green hue. Further work would be required to determine the cause of the emission.

New source of gem garnets from Idaho. Mr. Leon M. Agee, of Walla Walla, Washington, recently identified and faceted a number of deep brownish red gem-quality garnets that had been found by Mr. Kim Boyd in Clearwater County, Idaho. A reader of Gem News, Mr. Agee sent one of the garnets to the editor to examine. Shown in figure 1, the round brilliant-cut garnet measures 13.17 × 8.20 mm and weighs 11.06 ct. The



Figure 1. This 11.06-ct almandine-spessartine garnet was recently found in Clearwater County, Idaho. Photo © Tino Hammid.

gemological properties of this material suggest that it should be classified as an almandine-spessartine garnet. When the stone was studied with the hand spectroscope, a strong 432.0-nm band that could be attributed to the manganese in spessartine was observed, together with absorption characteristics typical of almandine. The refractive index was over the limits (1.81) of the refractometer, and the hydrostatically determined specific gravity was approximately 4.13. Examination with the microscope revealed a partially healed fracture composed of numerous tiny two-phase fluid inclusions, suggesting a possible pegmatitic origin.

We do not know how much of this garnet is available, but we do know that the area is currently being prospected. It is interesting to note that Mr. Boyd found the garnets while he was placer mining for gold.

Pectolite. Dr. Emmanuel Fritsch also supplied the following information on blue pectolite to Gem News.

Pectolite, known under the trade name "Larimar," is commonly found at gem shows as attractive greenish blue cabochons with flower-like radiating patterns. "Larimar" is the juxtaposition of "Lari," the name of the daughter of the mine's developer, Miguel Mendez, and "mar," which means "sea" in Spanish (Dan MacAuley, pers. comm.) in reference to the stone's color. No information on the geologic setting of the mine is available. However, research is currently being conducted on the origin of the color. Work at GIA's Research Department demonstrates that the optical absorption spectrum of pectolite is very similar to that of turquoise, with a broad absorption band at about 650 nm, in the orangy red. This band is interpreted as being due to the copper ion Cu^{2+} in octahedral coordination. Further evidence of the presence of copper in this gem came from a study of the black metallic inclusions in a piece of pectolite donated to GIA by Helen Tillet, of St. Thomas, U.S. Virgin Islands. X-ray powder diffraction, performed by Chuck Fryer, identified these inclusions as chalcocite (Cu_2S).

Phosphorescent fake. Ms. Loreen Haas, of Crown Gems in Sherman Oaks, California, was kind enough to send Gem News three unusual colorless quartz crystals. The smallest of these, shown in figure 2, measured $18.1 \times 10.1 \times 7.3$ mm, while the largest was recorded at $26.0 \times 14.2 \times 12.2$ mm. All three of the crystals had been core-drilled from the base and their centers filled with a mixture of phosphorescent powder and epoxy resin. The bases had then been capped with yellow metal bell caps so that the crystals could be worn in an inverted position as pendants. Any light source could excite the powder filling to phosphoresce blue-green (figure 3), so that if the

crystals were brought into a dimly lit or dark room they would be observed to glow.

The crystals were originally purchased (for a rather large sum) as natural glow-in-the-dark quartz crystals. Apparently, some sort of occult power was attributed to them. When the purchaser brought them to Ms. Haas for study, she became suspicious and so contacted Gem News. This is a totally new treatment to us. Unfortunately, we were not able to determine how much of this material is being manufactured and sold at the present time.

Undesirable color change in blue zircon. Ms. Janice Mack Talcott, of Talcott Enterprises, Inc., in Olympia, Washington, phoned the Gem News editor to ask if he or his colleagues had ever heard of color instability in blue zircon. One of the company's clients had worn a fine blue zircon ring in a tanning booth for about 20 minutes. When she emerged, she noticed that the stone had turned a muddy grayish greenish brown, apparently as a result of the exposure to ultraviolet rays.

We had never heard of such a change and could find no mention of it in the available literature. Therefore, we decided to see if we could duplicate the color change and also whether the change could be reversed.

Two faceted blue zircons of the same dark color were selected. One was exposed to long-wave ultraviolet radiation for 20 minutes, while the other was kept as a color control. The color change was dramatic: from bright blue through a light grayish brown (figure 4) to a muddy grayish greenish brown.

To reverse the change, we placed the muddy grayish greenish brown zircon on the tip of an upright 80-watt quartz halogen-powered fiber-optic illuminator. After two hours of exposure to this incandescent light, the stone had completely returned to its original blue color.

Figure 2. This colorless quartz crystal ($18.1 \times 10.1 \times 7.3$ mm) was core-drilled and filled with phosphorescent powder and epoxy resin. The piece was then capped to form a pendant.



Figure 3. After it was exposed to light, the filled quartz crystal shown in figure 2 glowed blue-green when placed in a dimly lit room.

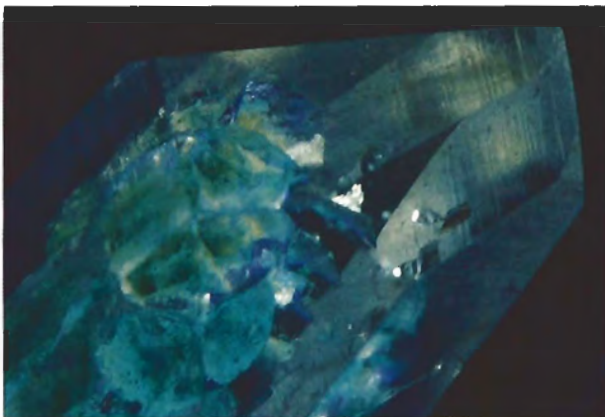




Figure 4. The grayish brown zircon on the right was the same color as the blue zircon on the left before it was exposed to long-wave ultraviolet radiation for 20 minutes. Note the radical color change. The most intense color obtained by this process—a muddy brown—was impossible to photograph because the lights required caused the stone to gradually revert back to its original color. Photo © Tino Hammid.

Exposure of the blue zircon to short-wave ultraviolet radiation also produced the same color change from blue to brown, and again the fiber-optic illuminator restored the original blue color.

Mr. Richard Hug of Cincinnati, Ohio, recently observed a similar color change in a blue zircon worn in a tanning booth. He reported that the zircon regained its original blue color after it had been placed on top of an ordinary light bulb for a couple of hours.

SYNTHETICS

Small, cuttable gem-quality synthetic diamonds: a reality. In the Spring 1985 Gem News column, we reported that Sumitomo Electric Industries and the National Institute for Research on Inorganic Materials, both in Japan, had succeeded in experimentally growing cuttable gem-quality synthetic diamond crystals as large as 1 cm and weighing up to 3.5 ct. We have now seen 10 pieces of synthetic diamond that were grown more recently by Sumitomo and are now being sold for industrial applications. These pieces are the property of Hughes Research Laboratory in Malibu, California, and were brought to the GIA Research Department for testing with the department's new infrared spectrometer. These fashioned pieces had been sawn, then laser cut, and then partly polished from the original crystals (which weighed up to 1.2 ct) into rectangular shapes weighing up to 0.40 ct and measuring approximately 4 × 4 × 2 mm.

Direct contact with Sumitomo's U.S. representative provided us with additional information on their product. On the basis of the infrared spectra, all of the synthetic diamond pieces are type Ib (dispersed nitrogen), which is intrinsically yellow and is often referred to in the trade as a "canary" color. This observation of diamond type immediately distinguishes the Sumitomo diamonds from the vast majority of natural yellow diamonds, which are type Ia. The synthetic diamonds are primarily being made for two industrial applications: heat sinks in electrical devices (Sumitomo's primary market for synthetic single-crystal diamonds), and industrial and surgical tools. The price range is \$60 to \$145 per rectangular piece for various sizes up to 0.40 ct. Sumitomo's representative also stated that they currently market the rectangular pieces only for scientific and industrial uses, and they do not intend to release any of the rough crystals. In addition, the company is currently experimenting with synthetic blue diamonds (type IIb) for use as semiconductors, and with synthetic colorless diamonds (type IIa) for industrial applications.

Because of the implications for the jewelry trade of this new technology, the GIA Research Department is currently documenting the gemological properties of the Sumitomo synthetic diamonds. The Sumitomo Company has been very cooperative in providing both samples of the synthetic diamonds and technical information. GIA Research purchased seven pieces of syn-

thetic diamond. Each had two large polished surfaces and various smaller crystal faces around the edges. They ranged from 0.11 to 0.37 ct. The largest piece measured $3.76 \times 3.63 \times 1.78$ mm. This piece was subsequently cut for maximum weight retention in an attractive faceted stone. The resulting 0.16-ct square-step-cut stone measures approximately $3.48 \times 3.33 \times 1.73$ mm, with a depth percentage of 52% and a weight retention of 44%. Considering the cost of the original piece of rough (\$145) and the assumed cutting cost, the price per carat of this synthetic diamond would be equal to or exceed the price of a natural diamond of similar hue and clarity.

On the basis of a preliminary gemological examination, GIA Research has determined that the Sumitomo synthetic diamonds have some distinctive properties that aid in their identification. Because they are type Ib, they lack the sharp "Cape" lines in the absorption spectrum that are characteristic of type Ia diamonds. The Sumitomo synthetic diamonds are also unusual in

their fluorescence behavior in that they are inert to long-wave ultraviolet radiation but fluoresce a greenish yellow to short-wave ultraviolet radiation. In color, the Sumitomo synthetic diamonds correspond to a fancy intense yellow. The pieces are often color zoned from deep yellow in the center to a narrow zone that is very pale yellow or colorless around the edges. The synthetic diamonds may display prominent internal grain lines and a "cruciform" strain pattern when observed between crossed polarizers. When the stones are viewed with the microscope, tiny metallic inclusions or white pinpoint inclusions may be observed. In addition, within the areas of deep yellow color, small colorless "vein-like" areas are visible. These features in combination are quite different from those found in natural diamonds of the same hue. The GIA Research Department is preparing a complete report on the Sumitomo synthetic diamonds for publication in *Gems & Gemology* in the near future. For further information, contact Dr. James Shigley, (213) 829-2991, extension 305.

ANNOUNCEMENTS

Fashion Institute of Technology presents "20th Century Design, International." This symposium will take place in New York on Saturday, November 15, 1986, and will feature world-renowned authorities on antique and 20th-century jewelry, including: Noelle De Gary, curator of the Musée des Arts Décoratifs; Fritz Falk, director of the Pforzheim Museum; Peter Hinks, of Sotheby Parke Bernet; and Graham Hughes, past director of Goldsmiths' Hall. For further information, contact the symposium coordinator, Jean Appleton, Jewelry Design Resource, (212) 760-7254.

Iberjoya will be held January 15–20 at the Ifema Exhibiton Center in Madrid. Contact: Institución Ferial de Madrid, Avenida de Portugal s/n, 28011 Madrid, Spain. Telex: 44025 IFEMA E.

Vicenzaoro 1 will be held January 15–22 at the Trade Fair Pavillions in Vicenza. Contact: Ente Fiera de Vicenza, Viale degli Scaligeri 34, 36100 Vicenza, Italy. Telex: 481542 FIER VII.

Jewelers International Showcase will be held January 17–19 at the

Miami Beach Convention Center. Contact: Jewelers International Showcase Inc., 9835 Sunset Drive, Suite 208, Miami, FL 33173; (305) 279-0951.

BIJORHCA will be held January 30–February 3 at the Parc des Expositions, Villepinte, Paris. Contact: BIJORHCA, 26 Rue de Renard, 75004 Paris, France. Telex: 680377 BOCIF.

The 1987 Tucson Gem and Mineral Show will be held February 12–15 at the Tucson Community Center. The featured species for the show this year is quartz. For more information, contact the Tucson Gem and Mineral Society, P.O. Box 42543, Tucson, AZ 85733.

Also in Tucson, February 7–12, the American Gem Trade Association (AGTA) show will be held at the Doubletree Hotel. During that time, the winners of the Spectrum Award (a jewelry design contest specifically aimed at the effective use of colored stones) will be announced. The deadline for entries is November 4, 1986. For more information about the contest, contact the AGTA headquarters at the World Trade Center #181, P.O. Box

581043, Dallas, TX 75258, (214) 724-4367.

Numerous other shows are held at various hotels and motels in Tucson (e.g., the Holiday Inn Broadway, the Quality Inn, the Desert Inn, and the Santa Rita) during this same period.

INHORGENTA 87 will be held February 13–17 at the Trade Fair Centre in Munich, West Germany. Contact: Munchener Messe-und Ausstellungsgesellschaft mbH, Messsegelände, Postfach 121009, D-8000 München 12, West Germany. Telex: 5212086 AMEG D.

International Watch, Clock and Jewellery Fair will be held February 14–17 at the Centrepont Exhibition, Centre Sydney. Contact: World Trade Promotions Pty. Ltd., 144 Riley Street, East Sydney, New South Wales, Australia. Telex: AA 176428 FSASYD.

Platinum Jewellery Fair 87 will be held February 16–17 at the Imperial Hotel, Tokyo, and on February 20 at the Hilton Hotel in Osaka. Contact: Platinum Guild International K.K., Imperial Tower 13A, 1-1-1 Uchisaiwai-cho, Chiyoda-ku, Tokyo 100, Japan. Telex: J29817 PGIKKJ.