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DIAMONDS

Chatham synthetic "white" diamonds at JCK show.

Three years ago, Tom Chatham of Chatham Created Gems, San Francisco, California, announced that he would be marketing "white" synthetic diamonds from Russia for jewelry use. Although it took longer than he originally anticipated, Mr. Chatham offered for sale a number of near-colorless synthetic diamond crystals at the June 1996 JCK show in Las Vegas, Nevada.

Mr. Chatham offered GIA Research a brief opportunity to examine about 100 of these synthetic diamond crystals (which ranged from about 10 points to almost a carat) before the show. Most were of small size and had too many inclusions for faceting. Research Associate Sam Muhlmeister and Research Gemologist Shane Elen focused their testing on four crystals of slightly better-than-average quality. These weighed between 0.41 and 0.51 ct, and were cubo-octahedral in crystal habit. All four had eye-visible metallic inclusions (figure 1), one had a typical white "cloud," one had relatively large stepped cavities (which resembled the hopper-growth cavities in, for instance, salt crystals, but are unusual in natural diamonds), and two had surface structures that looked like trigons. All four crystals were attracted to a strong magnet.

The crystals were inert to long-wave ultraviolet radiation, but fluoresced a very faint yellow or orange to short-wave UV. The UV fluorescence was typical, both in color and intensity, of that seen thus far in near-colorless synthetic diamonds; it is rare for a natural diamond to have a stronger fluorescence to short-wave than long-wave UV. However, no cross-shaped or octagonal pattern was visible in the UV fluorescence reaction—unlike the patterns reported previously for some synthetic diamonds (see, e.g., J. E. Shigley et al., "A Chart for the Separation of Natural and Synthetic Diamonds," Winter 1995, pp. 256–264). The crystals phosphoresced blue for at least one minute after exposure to short-wave UV; phosphorescence was much fainter in one than in the other three.

On the basis of their infrared spectra, we determined that these four samples were all type IIa (essentially nitrogen-free) synthetic diamonds. Near-colorless synthetic diamonds are typically type IIa or mixed type IIa

plus other types, whereas type IIa near-colorless natural diamonds are relatively rare.

Energy-dispersive X-ray fluorescence (EDXRF) spectroscopy disclosed both iron (Fe) and germanium (Ge) in all four crystals. GIA Research had not previously detected germanium in any diamond, natural or synthetic. They suspect that Ge is being added to the growth environment of these crystals to prevent nitrogen from incorporating into the crystal structure of the synthetic diamonds, as the nitrogen would color them yellow.

Although all of these properties indicated that these samples were synthetics, conclusive proof was provided most readily by the metallic inclusions, which were eye-visible in all four samples, and were easily identified with magnification. All four proved to be magnetic. The presence of Ge in these samples also provides proof of synthesis, but trace-element determination requires the use of equipment beyond the reach of the average gemologist. Mr. Muhlmeister and Mr. Elen cautioned that this preliminary study involved only four crystals; the properties of other Chatham synthetic "white" diamonds may differ.

Figure 1. Chatham "white" synthetic diamonds were recently offered for sale at the Las Vegas JCK Show. Note the numerous metallic inclusions—characteristic of synthetic diamonds—in this 0.51 ct example. Photo by Shane Elen.





Figure 2. This 2.14 ct diamond (9.40 × 8.46 × 5.26 mm) is an example of the "Buddha Cut." Photo by Maha DeMaggio.

Diamond novelty-cut as a seated Buddha. New forms of fashioned diamonds are designed either for novel light-transmission and weight-retention properties, or to resemble other items. Examples of the former cuts include the "Flanders Brilliant" (Gem News, Summer 1993, pp. 130–131) and the "Context" and "Spirit Sun" cuts (Gem News, Spring 1995, pp. 59–60). Examples of the latter include diamonds cut to resemble dice (Lab Notes, Fall 1985, p. 172) and letters of the alphabet (Lab Notes, Spring 1986, p. 47). We recently had the opportunity to examine a new cut, the "Buddha Cut" (figure 2), which is being marketed in the United States by J. Kleinhaus and Sons of New York City. The distribution of facets was reminiscent of triangular modified brilliants, with 33 crown facets and 21 pavilion facets (no culet). The girdle was also faceted; two GIA Gem Trade Laboratory (GTL) graders assessed the girdle as thick to extremely thick.

Some consumers wear "Buddha Cut" diamonds in necklaces, while others treat them as *objets d'art*, according to a J. Kleinhaus spokesperson. (The unmounted sample we examined did "sit up" by itself.) Because of the potential religious implications, the cutter reportedly has strict criteria governing cut symmetry and what constitutes a diamond appropriate for this cut. For example, the "head" region should be free of unsightly inclusions.

COLORED STONES

Nonphenomenal vanadium-bearing chrysoberyl. Attractive examples of green chrysoberyl, lacking change of color, were seen at the February 1996 Tucson gem shows; some material was marketed as "mint" chrysoberyl. Six months earlier, the editors had examined a 3.48 ct stone

cut from similar material. The gemological properties (see below) confirmed that this cushion-shaped modified brilliant cut was a natural chrysoberyl. We were somewhat surprised that there was no perceptible change of color (alexandrite effect) between incandescent and fluorescent light in a stone of such saturated green. With magnification, we noted a small brown-red crystal in the pavilion and growth zoning. EDXRF spectroscopy showed that the stone contained Al, Fe, V, Ti, Ga, and Sn. We had seen synthetic nonphenomenal green chrysoberyls colored by vanadium, but we had not previously examined natural vanadium-bearing chrysoberyls.

For comparison, we borrowed from Malhotra Inc., New York City, four faceted nonphenomenal green chrysoberyls (figure 3) that reportedly had been mined in Tanzania. Three had properties similar to the chrysoberyl in question. These included: pleochroism—trichroic colors of bluish green to blue-green/yellow-green to green/near-colorless to yellow; optic character—biaxial positive; color-filter reaction—none to faint pink; refractive indices—1.742 and 1.750–1.751; birefringence—0.008–0.009; specific gravity—3.71–3.72; luminescence to UV radiation—inert to faint orange (long wave) and inert to faint yellow (short wave); no luminescence to visible radiation; absorption spectrum in the desk-model spectroscope—440–445 nm band; infrared spectrum—strong features at 3225 and 2975 cm^{-1} , weaker features at 3140, 2850, and 2650 cm^{-1} ; UV-visible spectrum—bands at 415 and 608 nm, peaks at 318, 366, 375, and 380 nm. Again, EDXRF spectroscopy revealed Al, Fe, V, Ga, and Sn. The fourth stone (1.47 ct), which was bluish green, showed additional features typically associated with chromium (including a red reaction to the Chelsea color filter; moderate red luminescence to

Figure 3. These four vanadium-bearing chrysoberyls (1.47–13.52 ct) are reportedly from Tanzania. The smallest contains chromium as well as vanadium, but none shows change of color. Photo by Maha DeMaggio.





Figure 4. Electron microprobe analyses revealed significant differences in chemical content between this natural 11.14 ct bluish green vanadium chrysoberyl from the Tunduru area in southern Tanzania and the two synthetic chrysoberyls (right, 1.00 and 1.12 ct) produced in Russia. The natural stone is courtesy of W. Spaltenstein, Bangkok; photo courtesy of SSEF.

visible light; and a 590–665 nm absorption—and 670 nm emission line—seen with the handheld spectroscope, as well as Cr in the EDXRF spectrum); however, there still was no perceptible change-of-color.

Contributing editor Henry A. Hänni had the opportunity to examine an 11.14 ct “intense” bluish green chrysoberyl (figure 4) that was reportedly from Tunduru, Tanzania. An associate at the University of Basel, M. Krzemnicki, performed electron microprobe analyses on this stone and on two samples of Russian hydrothermal synthetic nonphenomenal chrysoberyl that had been purchased at Tucson. The natural stone contained 0.4 wt.% V_2O_3 , 0.2 wt.% Fe_2O_3 , and trace amounts of Cr, Sn, and Ga; whereas the synthetic chrysoberyls revealed more vanadium (1.8 wt.% V_2O_3), more chromium (0.2 wt.% Cr_2O_3), and no appreciable Fe, Sn, or Ga.

Large faceted chrome diopsides. At one of the 1996 Tucson shows, Alex Grizenko, of the Russian Colored Stone Company, Genesee, Colorado, showed an editor two dark green oval modified brilliants: chrome diopside from the Inagly mine, Yakutsk, Siberia, north of Lake Baikal. The larger oval, at 26.17 ct, may be the largest known example of this faceted material; however, the 25.33 ct stone (figure 5) was brighter. Although this is not a new find (the rough for these pieces was probably mined 30–40 years ago), this material is increasingly popular in the colored stone market. Mr. Grizenko kindly loaned us these samples for closer examination.

We recorded the following gemological properties for the two diopsides: color—dark green, with even distribution; pleochroism—weak, green to brownish green; diaphaneity—transparent; optic character—biaxial positive; Chelsea filter reaction—none. Refractive indices for the 25.33 ct stone were $\alpha = 1.670$, $\beta = 1.680$, and $\gamma = 1.699$, with a birefringence of 0.029; for the 26.17 ct stone, β was not determined, but $\alpha = 1.672$, $\gamma = 1.700$, and

birefringence was 0.028. Both stones had an S.G. of 3.30, were inert to both short- and long-wave UV radiation, and had very dark spectra as seen with a handheld spectroscope: The cut-off was at about 520 nm, with “chrome bands” at 630, 660, and 690 nm. Both stones contained scattered small crystals and “fingerprints,” visible with magnification but not particularly distinctive. EDXRF spectra of the two stones showed major Mg, Al, and Ca, with smaller amounts of Fe, Cr, Ni, Ti, and Sr.

“Rose”-colored plagioclase-corundum rock from Sri Lanka. In March 1995, contributing editor Henry Hänni received two small “rose” pink translucent pebbles (figure 6) that each had one small polished face. These stones reportedly came from a locality near Palledbedda, Ratnapura district, Sri Lanka. The sender could not identify them on the basis of the R.I. (1.576) and S.G. (2.98) values that he determined. He also noted weak chromium lines in the absorption spectrum.

At the SSEF in Basel, microscopic observation of the surface in reflected light revealed a granular groundmass (90%) with occasional interspersed aggregates of idiomorphic crystals, which ranged from 20 to 70 microns (10%). The pink crystals had a hardness greater than that of the groundmass, as seen by their relatively higher relief. EDXRF analysis of the entire pebble indicated that Si, Al, and Ca were the main constituents, with Cr, Fe, and Sr present as trace elements. On the basis of SEM-EDS analysis of individual mineral grains within the pebbles, the main (groundmass) mineral component was identified as Ca-rich plagioclase feldspar, and the interspersed harder grains were identified as corundum. The Cr was contained in the corundum, which explained the rock’s pink

Figure 5. The Inagly mine, Yakutsk, Siberia, is the source of this 25.33 ct (22.10 × 15.95 × 9.43 mm) chrome diopside, one of the largest such stones ever seen by the editors. Stone courtesy of the Russian Colored Stone Company; photo by Shane F. McClure.





Figure 6. Mixtures of feldspar and corundum, these two pebbles from Sri Lanka have some gem properties common to both materials. The largest pebble is about 1 cm across. Photo courtesy of SSEF.

color and the Cr spectrum. The higher density of the pebbles—about 2.98, compared to 2.76 for anorthite (plagioclase)—is also explained by the admixture of corundum.

Dr. Hänni doubts that this material will have great gemstone potential, but he considers it an interesting gemological puzzle: As a mixture of feldspar and corundum, it has the R.I. of one, the spectrum of the other, and an S.G. intermediate between the two.

Quartz-magnesite rock, so-called “lemon chrysoprase,” from Australia. In past Gem News items, we have reported on various yellow-green materials from Australia, including the cryptocrystalline quartz variety chrysoprase (Summer 1994, pp. 125–126; Fall 1994, pp. 193–194), colored by nickel, and the nickel-carbonate mineral gaspeite (Summer 1994, pp. 125–126), sometimes marketed as “Allura.” Another Australian material was seen throughout the 1996 Tucson gem shows, marketed as “lemon chrysoprase.” After a cursory initial inspection, the curiosities of contributing editors Dino DeGhionno and Shane McClure were piqued; they decided to investigate further.

They acquired several samples, including a strand of 7 mm beads and a heart-shaped pendant (figure 7), and selected one 2.27 ct bead for detailed examination. The semi-translucent light yellowish green bead had a specific gravity of 2.83 and refractive indices of 1.51–1.68, with a pronounced carbonate “blink.” Fluorescence to both long- and short-wave UV radiation was unevenly distributed—weak yellow in scattered areas. The absorption spectrum viewed with a desk-model spectroscope showed a lower wavelength cutoff at 450 nm; a dark band between 490 and 510 nm; lines at 600, 615, and 630 nm; and an upper-wavelength cutoff at 640 nm. With magnification, distinct areas of a lighter colored, more opaque material and a brighter yellowish green, more translucent material could be seen in the bead; the more

opaque material had higher relief (that is, it was harder than the greener material).

EDXRF analysis revealed silicon, magnesium, and nickel. X-ray diffraction powder patterns were consistent with two phases being present: quartz and a carbonate with the calcite structure. The unit-cell spacings determined for the carbonate mineral were consistent with magnesite ($MgCO_3$) rather than gaspeite ($NiCO_3$); however, there is a solid solution between these two minerals, so that a phase can have up to 50% gaspeite and still be considered magnesite mineralogically. One identification question remained: Was the quartz material colored green by nickel (that is, was it chrysoprase?), or was it merely intergrown with the yellow-green carbonate? To answer this, the bead was submerged in a hydrochloric acid solution: The bead was selectively dissolved and turned white; a diffraction pattern showed only quartz. Consequently, we concluded that the “lemon chrysoprase” was not chrysoprase at all, but rather a rock consisting of (white) quartz and (yellowish green) magnesite.

Update on Madagascar sapphires. The Summer 1996 *Gems & Gemology* featured an article on sapphires from Madagascar’s Andranondambo region (by D. Schwarz et al., pp. 80–99). Since then, we have received additional information about significant discoveries of sapphire elsewhere in this region. Thomas Banker, of Gem Essence Co., Bangkok, Thailand, writes that large quantities of sapphires have also been found at Antsiernene, about 10–12 km north of Andranondambo. The “sapphire rush” at Antsiernene began not long before Mr. Banker’s April 1995 visit. Mining resembled that at Andranondambo, with each individual digging accompanied by its own small tailings pile of white plagioclase-rich rock. By his second visit in November 1995, a considerable shanty town (with about five streets) had developed next to the diggings (figure 8); Mr. Banker estimated

Figure 7. This “lemon chrysoprase” is really a quartz-magnesite rock. Photo by Maha DeMaggio.

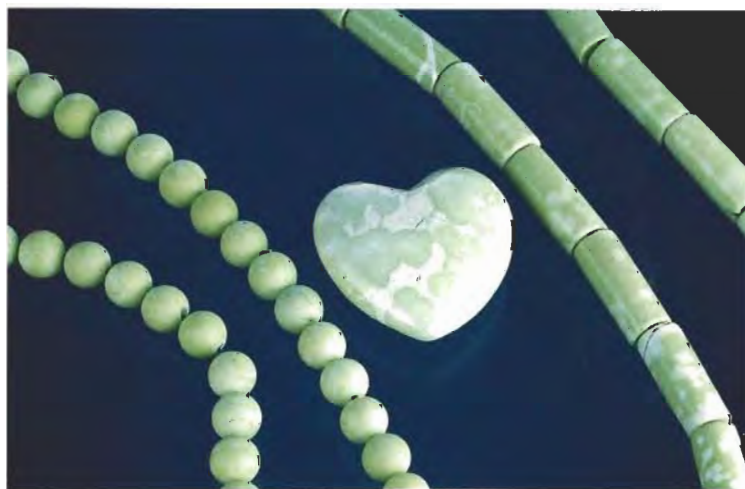




Figure 8. By November 1995, a large shanty town, with a population in the thousands, had grown up adjacent to the Antsiernene sapphire diggings. Photo courtesy of Thomas Banker.

that 2,000–3,000 miners inhabited this town at the time of his visit, and others commuted from Andranondambo. The diggings covered about 3–5 km².

Madagascar is also the source of a large (17.97 kg, 29 × 19 × 16 cm) crystal that was recovered late last year from an

Figure 9. This 89,850 ct blue sapphire crystal, here held by gem dealer Jeffrey Bergman, was found in Madagascar late last year.



undisclosed region. The deep blue crystal (figure 9) was the subject of a short report in the June–July 1996 *JewelSiam* ("The Find of a Lifetime," pp. 86–87).

Spessartine from Pakistan. Late last year, the Gem News editors were loaned samples of spessartine from a relatively new locality, Azad Kashmir, in northeastern Pakistan. Dr. Lon C. Ruedisili of Ruedisili Inc., Sylvania, Ohio, provided a 22.31 ct rough crystal and four faceted examples (figure 10) of this garnet, which is being marketed as "Kashmirine." Gemological investigation of the faceted stones revealed: color—slightly yellowish orange to brownish orange or red-orange; diaphaneity—transparent; color distribution—even; optic character—singly refractive, with weak anomalous double refraction; color filter reaction—orange; refractive index—1.800; specific gravity (measured hydrostatically)—4.19 to 4.20; inert to both long- and short-wave UV radiation; and a typical spessartine absorption spectrum, with bands at 410, 420, and 430 nm visible with strong transmitted light in a desk-model spectroscope. Using magnification (and for some stones, polarized light), we saw internal growth zoning (figure 11) in all samples. In addition, the 2.31 ct stone contained acicular inclusions, possibly birefringent (figure 12), and the 1.91 ct stone contained two small "fingerprint" inclusions. Dr. Ruedisili also provided UV-visible absorption spectra of some of this material—obtained by Dr. Eric Findson of the University of Toledo, Ohio—which showed absorption maxima at 408.5, 422, 430, 461, 482.5, 504.5, 522.5, 563.5, and 611 nm. These gemological properties are similar to those given in a short article on this material by Dr. U. Henn ("Spessartine aus Pakistan," *Zeitschrift der Deutschen Gemmologischen Gesellschaft*, Vol. 45, No. 2, 1996, pp. 93–94). Dr. Henn reports the composition of one stone (determined by electron microprobe analysis) as 85.26 mol.% spessartine, 10.13 mol.% almandite, and 4.61 mol.% grossular garnet.

According to Dr. Ruedisili, this material first became known when a 19.30 gram specimen was discovered in the summer of 1993. A representative of the Remy Company, Pakistan (partners with Ruedisili Inc.), saw some of the material at the Mineral and Industrial Development Corporation (MIDC), Azad Kashmir, government auction in April 1994. The "Kashmirine" garnets are found in a pegmatite in the Janwai-Folawai region (Neelum Valley) of Azad Kashmir. The deposit is about 177–200 km (110–124 miles) northeast of Muzaffarabad. Seven pegmatites are being explored for garnets and other gem materials. The main mine is in Jandranwala Nar pegmatite no. 1, which lies about 1.5 km northeast of Folawai Village, at an altitude of 2,590 m. The pegmatite occurs in a migmatite complex, and averages 15 m by 2 m; so far, 143 m³ have been excavated. In addition to the spessartines, quartz and greenish black tourmaline have been found in the gem zone of this pegmatite. These same minerals occur in the neighboring Donga Nar pegmatite, but the spessartine is not of gem quality.

Thirteen kilograms of spessartine were mined in 1994, and 16 kg in 1995. Approximately 20% of this production was suitable for cutting as cabochons or faceted stones. Most of the fashioned "Kashmirines" seen to date are in the 0.75–7.50 ct range, with a very few stones above 7.5 ct. The largest to date is about 30 ct. A joint venture between Ruedisili Inc., the Remy Company, and the Azad Kashmir MIDC is being planned, in order to exploit the spessartines and other gem materials—including morganite, aquamarine, "mint green" and bicolored tourmaline, and topaz—from pegmatites in this region.

Figure 11. Internal growth zoning is visible with transmitted light in this 1.10 ct spessartine garnet from Pakistan. Photomicrograph by John I. Koivula; magnified 30×.

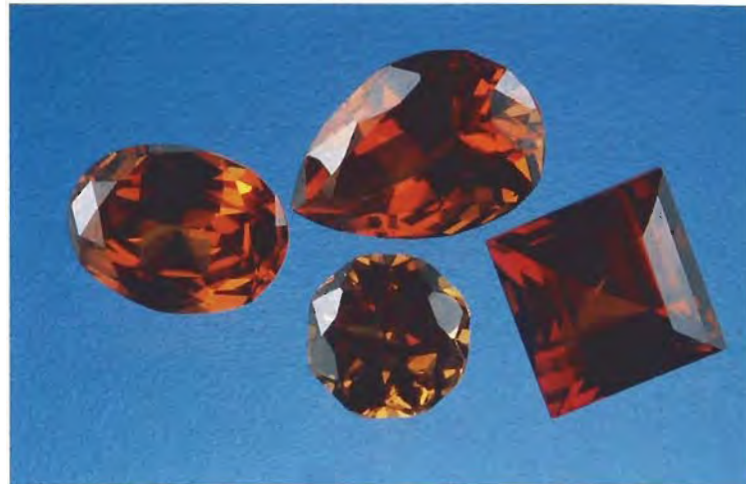
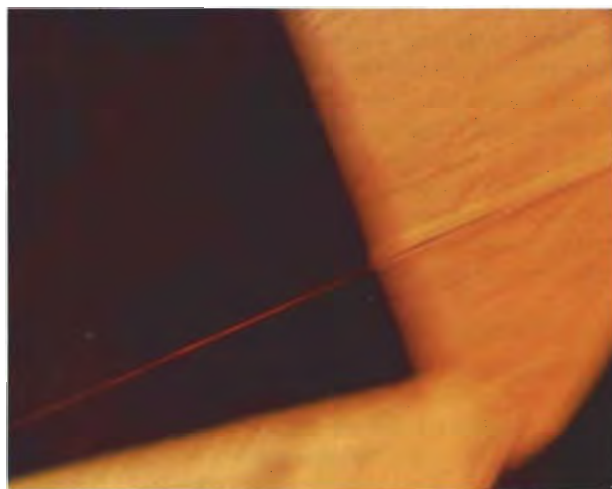


Figure 10. These four spessartines (0.69–2.31 ct) are from Azad Kashmir, Pakistan. Photo by Maha DeMaggio.

Activity continues at the Capão do Lana "Imperial" topaz mine. Two mining sites near the historic city of Ouro Preto in Minas Gerais, Brazil, are famous for their production of fine Imperial topaz: Capão do Lana and Vermelhão. Currently, operations at the Vermelhão/HCC/Alcan mining complex, on the outskirts of Ouro Preto, are temporarily halted because of a landslide on the boundary between two concessions, according to geologist Daniel Sauer, of Amsterdam Sauer, Rio de Janeiro, Brazil. However, the Capão do Lana mine, in the Rodrigo Silva district, is fully operational.

Figure 12. When examined with polarized light, these needle-shaped inclusions in a 2.31 ct spessartine garnet from Pakistan appeared to be birefringent. Photomicrograph by John I. Koivula; magnified 25×.

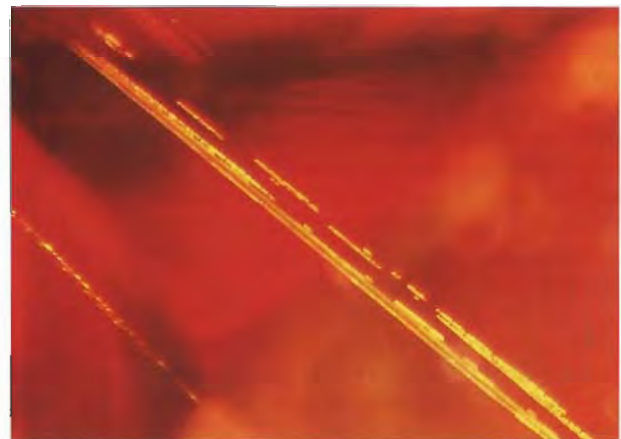




Figure 13. Draglines stretch across the large open pit at the Capão do Lana Imperial topaz mine. Large buckets suspended from the two lines scoop up the gem-bearing slurry from the bottom of the pit and drag it to the top for processing. Photo by Daniel A. Sauer, Amsterdam Sauer, Rio de Janeiro.

During an August 1996 visit to Capão do Lana, Mr. Sauer and *Gems & Gemology* editor Alice Keller observed the mining operations at what are now two large open pits (approximately 30 m at the deepest point, covering a total area of about 5 ha, or 12 acres) next to one another in the 800–1,000 ha (2,000–2,500 acre) concession area. Using draglines (figure 13), bulldozers, and water cannons, miners recover an average of 11,000 m³ of mineralized rocks a month, which are processed to yield about 100 kg of topaz crystals. The estimated yield of fashioned stones from this material is 5,500 ct. Approximately 50 people are currently involved in mining and processing the ore.

Typically, the material is heavily included, so totally clean crystals are quite rare. At the mine office, Mr. Sauer and Ms. Keller saw topazes in a wide range of colors—light yellow, orange-yellow, brownish orange, pinkish orange (“salmon” or “peach”), pink, reddish orange, orange-red, and purple or violet (figure 14)—all of which

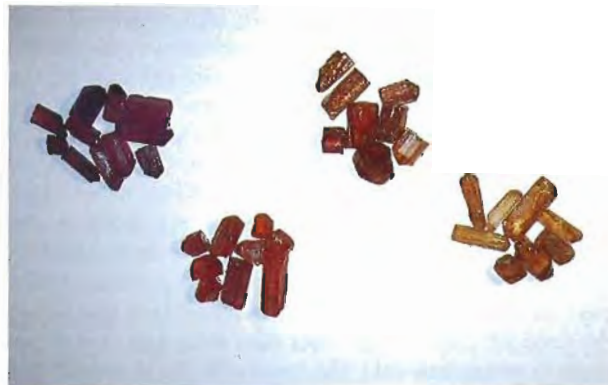


Figure 14. Topaz occurs in a wide range of colors at Capão do Lana, as these groups of natural-color crystals seen at the mine office in Rodrigo Silva demonstrate (the largest crystal is 180 ct). Red and purple are the rarest colors. Photo by Daniel A. Sauer.

are marketed as Imperial topaz. The most sought-after are the intense pink, red, and purple stones, which—according to mine director Wagner Colombaroli—represent less than one-half of one percent of the total cuttable material. Although these colors occur naturally, many of the pink and red stones on the market today were produced by heat treating the original rough to remove the yellow component.

An article on gem topaz from the Capão do Lana deposit is in preparation for an upcoming issue of *Gems & Gemology*.

Gem materials from Vietnam. Items on gems from Vietnam regularly appear in *Gem News* (see, e.g., Winter 1992, pp. 274–275; Summer 1993, p. 134; Fall 1993, pp. 211–212; Winter 1993, p. 285; and Fall 1994, p. 197). Vietnamese gems from many provinces were available at the 1996 Tucson shows. Mary Nguyen of Van Sa International, Marina del Rey, California, showed one of the editors (MLJ) several examples of gem rough from Vietnam, including: aquamarine and topaz from Thanh Hoa; topaz from the Darlac Plateau; ruby and sapphire rough from Luc Yen; zircon and opal from Pleiku; amethyst and citrine from Phan Thiet; and several materials from Lam Dong, among them tourmaline, peridot, petrified wood, chalcedony, and tektites. This extensive assortment suggests that Vietnam—a region with little previous history or lore in gemology—promises to be a rich source of gem materials for many years to come.

TREATMENTS

Coated quartz in “natural” colors. One of the techniques commonly used to change the apparent color of gems is that of coating the sample with a colored material (see, e.g., “‘Tavalite,’ cubic zirconia colored by an optical coating,” Summer 1996 *Gem News*, pp. 139–140). The most prominent example of this technology is so-called “aqua-

aura" quartz, which owes its blue color to a thin surface coating of gold (Gem News, Winter 1988, p. 251; Fall 1990, pp. 234-235). At one of the 1996 Tucson shows, mineral dealer Rock Currier of Jewel Tunnel Imports, Baldwin Park, California, showed one of the editors (MLJ) several examples of coated quartz crystals in colors resembling natural quartz varieties. Four samples (figure 15) were borrowed for further study; these resembled amethyst, citrine, green "prasiolite" (heated amethyst), and red "strawberry quartz." The coatings contained gold, bismuth, lead, chromium, titanium, and lesser amounts of calcium, potassium, and iron, as determined by EDXRF spectroscopy. As with the "aqua-aura" quartz, the coatings on these samples were too thin to affect the 1.54 R.I. value expected for quartz.

SYNTHETICS AND SIMULANTS

Flexible "crystal" fabric. A new product from the Swarovski Company of Wattens, Austria, is a flexible mesh fabric of faceted glass "crystals" (figure 16). The editors recently examined a sample of this "Crystal Mesh," which consisted of 238 mounted foil-backed single-cuts, each about 2.7-2.8 mm in diameter, which (in our sample) occurred in three colors:

- Near-colorless (which had a weak-to-moderate, even light blue fluorescence to long-wave UV radiation,

Figure 16. This 43 × 52 mm flexible swatch of "Crystal Mesh" contains 238 single-cut glass "crystals." Photo by Maha DeMaggio.



Figure 15. These four quartz clusters (32.3-68.17 mm long) owe their colors to thin coatings of gold, bismuth, lead, and other elements. Photo by Maha DeMaggio.

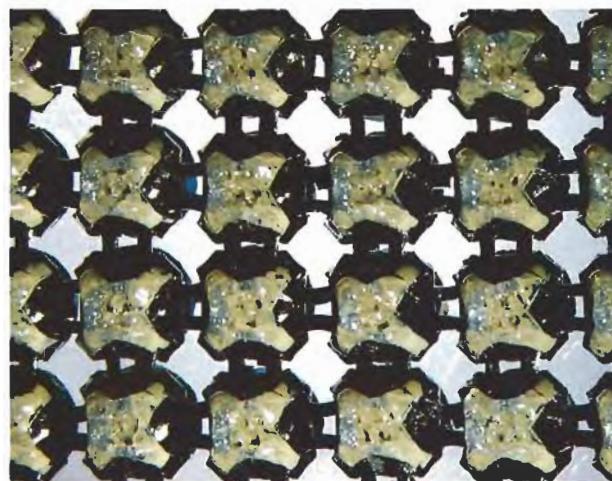
and a moderate-to-strong, even whitish yellow fluorescence to short-wave UV radiation)

- Light blue (fluorescing a slightly chalky, weak-to-moderate, even yellow-orange to long-wave UV and a moderate-to-strong, even light blue to short-wave UV)

- Medium dark blue (fluorescing a weak-to-moderate, even blue to long-wave UV and a moderate-to-strong, even blue to short wave UV)

All had the same refractive index, 1.578. When examined with the microscope, these single-cuts were mostly free of inclusions, although some contained scattered gas bubbles. Each single-cut was foil-backed and

Figure 17. The single-cuts in the "Crystal Mesh" sample shown in figure 16 are mounted in black cups, which are connected by prongs through black rings; the prongs are cemented closed. View from the back side, magnified 2×. Photomicrograph by John I. Koivula.



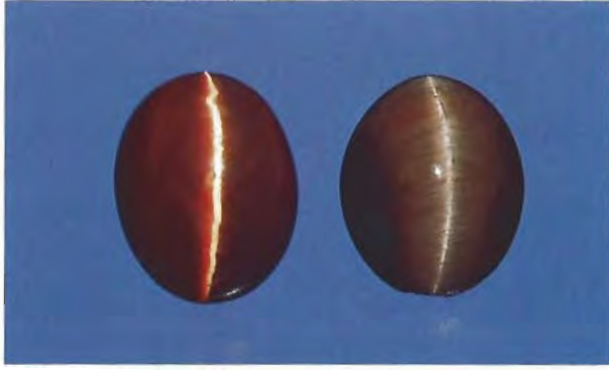
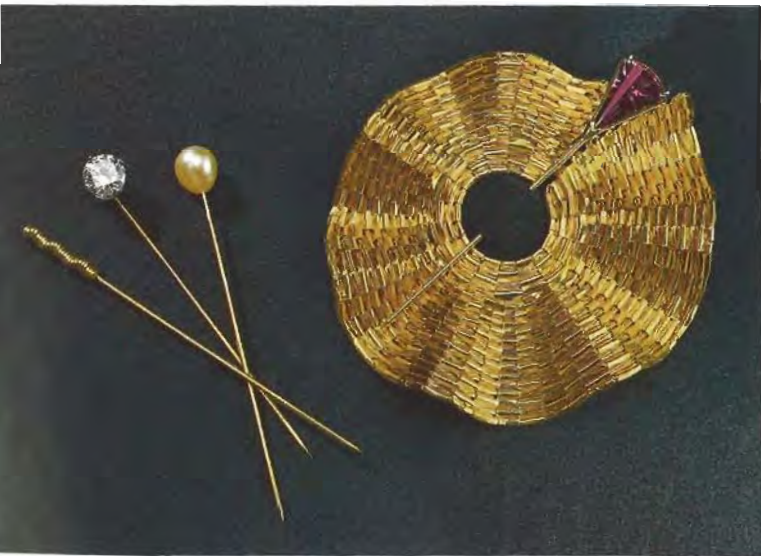


Figure 18. Optical fiber glass—like the 2.85 ct cabochon (10.03 × 7.86 × 4.09 mm) on the left—is being produced in colors such as this specifically for gem use. A natural (heat-treated) tiger's-eye cabochon (1.83 ct, 9.61 × 7.96 × 3.67 mm) is shown on the right for comparison. Photo by Maha DeMaggio.

fastened with black glue into a black-painted metal cup; these cups alternated with black-painted metal rings, with one of four prongs on each cup folded through the adjacent rings and then glued shut with a brown rubbery material (figure 17). According to product information supplied by the manufacturer, "Crystal Mesh" can be machine-washed but not dry cleaned. Additional colors

Figure 19. A stickpin mounted with a tourmaline attaches this woven 18K gold brooch to the wearer's jacket or dress; other stickpins can be used to change the appearance of the piece. Gold wire-, diamond-, and pearl-mounted pins are shown; the brooch is about 5 cm in diameter. Pieces made by Barbara Berk; photo © Harold and Erica Van Pelt, Los Angeles.



and patterns are available, and "Crystal Mesh" is available in pieces as large as 20 × 50 cm (about 8 × 20 inches).

Fiber-optic glass imitation of tiger's-eye. Entries on fiber-optic glass (marketed under the names "Catseyte," "Cathaystone," and "Fiber Eye") appeared in the Summer 1991 and Summer 1994 Gem News sections. In the latter section, gray fiber-optic glass was discussed as a simulant of cat's-eye sillimanite from Orissa, India. Fiber-optic glass, which is most often oriented in fashioning to produce an extremely sharp chatoyant band, has been commercially available for some time in two colors: white and brown.

During the last few years, we have seen additional colors on the market: saturated yellow, pink, purple, black, and blue, as well as a more subdued "gunmetal" grayish blue that yields cabochons reminiscent of hawk's-eye quartz, a bright green similar to some cat's-eye diopside now coming from India, and a reddish orange similar to some heat-treated tiger's-eye (figure 18). The most recent material seen was "striped" in red/white/green, red/blue/green, and red/white/blue. According to a representative of Teton Gems, Boise, Idaho, the white and brown material previously available had been produced and rejected for laser or other technical applications. The newer colors, however, were produced specifically for their gem potential.

Gemological investigation of the 2.85 ct reddish orange glass cabochon shown in figure 18 revealed: 1.55 spot R.I.; 3.09 S.G.; moderate red appearance through the Chelsea filter; weak, dull red fluorescence to long-wave UV and strong, chalky whitish yellow fluorescence to short-wave UV. Magnification revealed that the optic fibers have hexagonal outlines with a "honeycomb-like" structure similar to that seen in other fiber-optic glasses. Also seen, when looking parallel to the fibers, was a "speckled" color appearance, apparently the result of orange fibers intermixed with colorless ones.

Some of the cabochons displayed a somewhat less distinct chatoyant band than what has typically been encountered. According to the vendor, these stones had been cut as lower-domed cabochons to give the "eye" a more natural appearance.

MISCELLANEOUS

Versatile jewelry. A recurring trend in jewelry design is that of creating pieces in which the stones are interchangeable, enabling the wearer to adjust color schemes or "looks" with minimum effort. One attractive contemporary example of this trend is a brooch and stickpin combination (figure 19) designed by Barbara Berk, of Foster City, California. With this set of combination jewelry, the overall appearance can be easily altered by changing stickpins; in addition to the tourmaline, diamond, pearl, and gold wire pins pictured, the set that we saw contained citrine- and onyx-headed stickpins. Virtually any gem material could be adapted for this use.