



Figure 16. The 2.67 ct Brazilian rhodonite in this pendant is set with 111 yellow and 25 pink diamonds (with a total weight of 0.48 and 0.12 carats, respectively). Courtesy of Alan Freidman; photo © Harold and Erica Van Pelt.

rescence—inert to very weak red to both long- and short-wave UV radiation. The following absorption bands were observed with the desk-model spectroscope: a strong band at 410 nm, weak lines at 430 and 460 nm, a moderate line at 500 nm, and a wide band at 520–560 nm. Microscopic examination revealed numerous randomly oriented curved needles, cleavage cracks, “fingerprints,” and two-phase inclusions in both samples, as well as some transparent brown-yellow euhedral crystals in the cabochon.

The gemological properties are comparable to those reported for rhodonite in the literature (see e.g., R. Webster, *Gems*, 5th ed., rev. by P. G. Read, Butterworth-Heinemann, Oxford, 1994, p. 365). Although some of the properties of rhodonite and pyroxmangite overlap, the relatively low R.I.’s and birefringence of the two samples we examined are indicative of rhodonite. Also, Raman analysis of two spots on the cabochon and one spot on the faceted stone yielded spectra that more closely matched rhodonite than pyroxmangite. EDXRF analyses of the two samples by GIA Gem Laboratory senior research associate Sam Muhlmeister showed major amounts of Si and Mn, as well as traces of Fe and Ca (and possibly Zn in the faceted stone).

As with the Australian material, the main challenge with cutting the Brazilian rhodonite is its perfect cleavage in two directions. This, combined with a Mohs hardness of $5\frac{1}{2}$ – $6\frac{1}{2}$ and the fact that limited transparent material is available for faceting, means that it will remain a collector’s stone. Nevertheless, the availability of even a small amount of faceting-quality rhodonite from the Brazilian source has created interesting opportunities for setting the material into jewelry (figure 16).

Elizabeth P. Quinn (equinn@gia.edu)
GIA Gem Laboratory, Carlsbad

BML

Spessartine and almandine-spessartine from Afghanistan.

Beginning in mid-2002, these contributors received occasional reports of new spessartine discoveries in Afghanistan, and a few faceted stones stated to be from this production were seen at the Tucson gem shows in 2003 and 2004. Recently, a multitude of rough and cut samples of this material were loaned (and, in some cases, donated) to GIA by Sir-Faraz (“Farooq”) Hashmi of Intimate Gems. Most of these samples were purchased in late 2003, in the mineral bazaar at Peshawar, Pakistan. The dealers reported the garnets were mined from pegmatites in the Darre Pech area of Kunar Province, where they were apparently recovered as a byproduct of mining for kunzite and tourmaline.

The rough material we examined (see, e.g., figure 17) consisted of a 385-gram parcel of loose pieces and two

Figure 17. Since mid-2002, increasing amounts of spessartine (and some almandine-spessartine) have emerged from Afghanistan. The spessartine in matrix measures at least 3 cm in diameter, and the loose crystals weigh 3.59–15.47 ct. Courtesy of Intimate Gems; photo by Maha Tannous.





Figure 18. This group of yellow-orange to orange spessartines from Afghanistan ranges from 0.78 to 1.68 ct. Courtesy of Intimate Gems; photo by Maha Tannous.

matrix specimens. One of the specimens was a small crystal of kunzite (2.6 cm long) associated with spessartine and feldspar, while the other consisted of spessartine in a matrix of albite (cleavelandite variety) and K-feldspar that was covered by a thin layer of a porcelainous clay-like material (again, see figure 17). The spessartine crystal in the latter specimen measured at least 3 cm in diameter, with some areas suitable for faceting. The rough parcel consisted of broken fragments and a few well-formed crystals, as well as pieces that were moderately to heavily corroded (as is typical of spessartine from some pegmatites).

Figure 20. At 12.58 ct, this oval brilliant provides a fine example of a relatively large spessartine from Afghanistan. Courtesy of Mark Kaufman of Kaufman Enterprises, San Diego, California; photo by Maha Tannous.

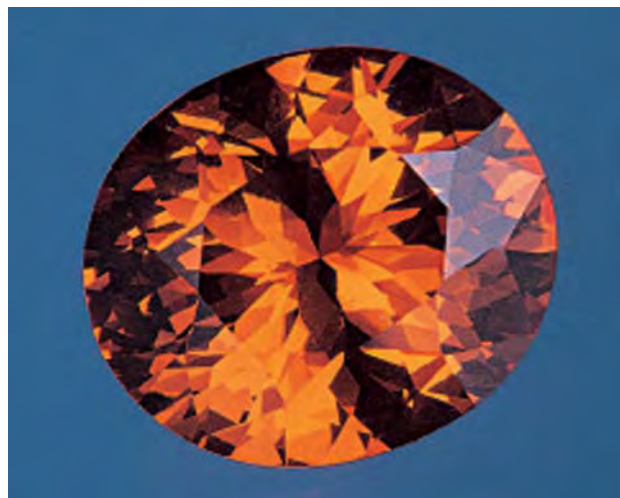


Figure 19. This group of orange-red to dark red almandine-spessartines (0.41–1.28 ct) is reportedly from the same mining area as the orange spessartines in figure 18. Courtesy of Intimate Gems; photo by Maha Tannous.

The faceted examples we examined comprised two distinct color groups. Each group was cut from rough purchased at different times, but represented as being from the same mining area. One group ranged from yellow-orange to orange (figure 18), and the other ranged from orange-red to dark red (figure 19). Two stones from each color group were chosen by one of us (EPQ) for examination. The following properties were obtained: R.I.—1.799 (yellow-orange), 1.802 (orange), and both red stones were above the limits of a standard refractometer; S.G.—4.26 (yellow-orange), 4.28 (orange), and 4.22 (orange-red), and 4.24 (red); fluorescence—all were inert to both long- and short-wave UV radiation, and all had similar absorption spectra when viewed with a desk-model spectroscope. The absorption features consisted of strong bands at 410 and 430 (although these two bands converged in the red stones, creating a cutoff at 440 nm), with weaker bands at 460, 480, 505, 520, and 570 nm. In the two red stones, the 505 and 570 nm bands were more pronounced than they were in the orange stones. This is consistent with their greater inferred iron content, as indicated by their darker and redder color. Based on these properties, the orange-red to dark red garnets are probably a mixture of spessartine and almandine.

Microscopic examination revealed “fingerprints,” two-phase inclusions, and needles in all four of the samples. The properties of the yellow-orange to orange stones are comparable to those reported for spessartine from other deposits (see compilation in B. M. Laurs and K. Knox, “Spessartine garnet from Ramona, San Diego County, California,” Winter 2001 *Gems & Gemology*, pp. 278–295), except for the higher S.G. values obtained for the Afghan samples in this study.

According to Mr. Hashmi, most of the facetable rough seen thus far in the Peshawar market has weighed less than 2 g, although some 3–5 g pieces were available and the largest clean rough known to him weighed 15 g (a

well-formed crystal). The faceted material has typically ranged up to 2 ct, although a 12.58 ct oval brilliant reportedly from this locality was seen at the 2003 Tucson gem shows (figure 20).

Curiously, faceted examples of this spessartine look very similar to the hessonite that also has come from eastern Afghanistan in recent years (see entry on pp. 258–259 of this section). In fact, Mr. Hashmi cautioned that some rough parcels he has examined contained both types of garnets.

Elizabeth P. Quinn
GIA Gem Laboratory, Carlsbad

BML

Gem tourmaline from Congo. Africa has long been an important source of gem tourmaline; of particular interest are the countries of Nigeria, Namibia, Zambia, and Mozambique. In recent years, however, the Democratic Republic of the Congo (DRC, formerly known as Zaire) has occasionally yielded attractive gem rough and collector-quality crystals. While information on the exact sources in the DRC was not available to these contributors, the appearance and composition of these tourmalines indicates they are derived from granitic pegmatites.

The Central African pegmatite province includes numerous pegmatite fields in a broad region encompassing Uganda, Rwanda, Burundi, the eastern DRC, northern Zambia, western Kenya, and western Tanzania. Most of these pegmatites are categorized in the rare-metal class and are associated with Early Proterozoic granites (800–1,000 million years old; V. Ye. Zagorsky et al., *Miarolitic Pegmatites*, in Vol. 3 of B. M. Shmakin and V. M. Makagon, Eds., *Granitic Pegmatites*, Nauka, Siberian Publishing Firm RAS, Novosibirsk, Russia, 1999 [in Russian]). In the eastern DRC, the pegmatites are located in the Nord-Kivu, Sud-Kivu, and Katanga provinces (N. Varalamoff, “Central and West African rare-metal granitic pegmatites, related aplites, quartz veins and mineral deposits,” *Mineralium Deposita*, Vol. 7, 1972, pp. 202–216). These deposits have been mined for decades for cassiterite (Sn) and industrial beryl (Be), but miarolitic pegmatites that host gem-quality tourmaline, beryl, and other minerals are apparently uncommon in the DRC.

In mid-2000, gem dealer John Patrick (El Sobrante, California) obtained about 200 g of variously colored DRC tourmaline through an African supplier. The supplier indicated the material came from the Virunga region north of Goma (Nord-Kivu Province). Mr. Patrick donated three green/pink crystals (2.5–4.0 cm long) and five multicolored slabs (1.5–2.9 cm wide) to GIA for research purposes. The slabs had irregular outlines and were concentrically zoned around the c-axis in pink and green; one sample had a blue core. All of these samples were semitransparent due to fluid inclusions and fissures, as are typically seen in tourmaline.



Figure 21. Transparent tourmalines, for the most part green to blue, recently have been recovered from the Democratic Republic of the Congo. These crystals, up to 4 cm long, are courtesy of New Era Gems; photo by Maha Tannous.

More recently, an undisclosed locality in the DRC has yielded transparent prisms of mostly green-to-blue tourmaline (figure 21). Steve Ulatowski (New Era Gems, Grass Valley, California) first obtained this material in mid-2003, and he estimates that about 20–30 kg/month were produced in early 2004. Since then, however, production appears to have diminished. Mr. Ulatowski purchased about 3 kg of the rough, of which 30% was facetable (see, e.g., figure 22), 60% was cabochon grade, and 10% was bead quality. The largest clean piece of gem rough he acquired weighed approximately 30 grams, although stones faceted from the

Figure 22. These tourmalines (5.78 and 15.94 ct) were cut from material similar to that in figure 21. These stones were faceted by Thomas Trozzo (Culpeper, Virginia). Photo by C. D. Mengason.

