Figure 10. This colorless 3.54 ct forsterite reportedly came from Kukh-i-Lal, in the Pamir Mountains of Tajikistan. Photo by Robert Weldon.

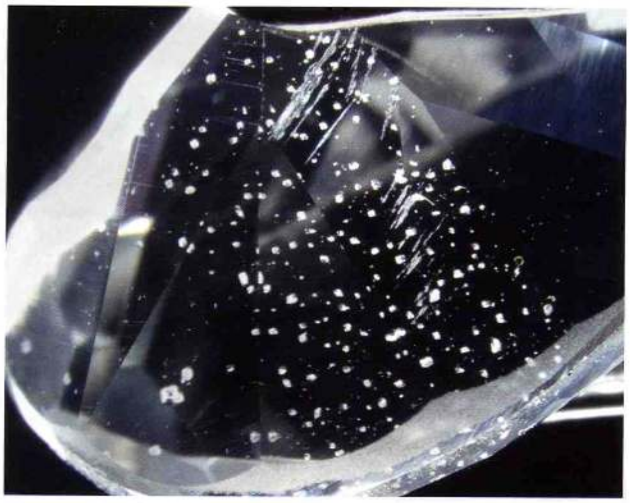

Figure 11. The forsterite contains a "fingerprint" composed of euhedral-to-subhedral inclusions. The linear features superimposed over the fingerprint are scratches. Photomicrograph by D. M. Kondo; field of view 7.2 mm.

showed average concentrations of 43.7 wt.% MgO and 0.34 wt.% FeO. As Mg is strongly dominant over Fe, the stone's composition lies near the forsterite end of the forsterite-fayalite series.

Microscopic examination showed a "fingerprint" composed of euhedral-to-subhedral inclusions (figure 11). With higher magnification and diffused lighting, these inclusions were observed to contain a white, fine-grained solid and—in some cases—a dark opaque crystal with a hexagonal outline (figure 12).

UV-Vis spectroscopy revealed weak absorption features at 451, 473, and 491 nm. Raman spectra taken with 488 and 514 nm laser excitation matched the forsterite and peridot spectra from our database. A 514 nm Raman scan was also taken up to 6000 cm^{-1} to investigate the fluorescence behavior. This showed a broad band with the maximum at approximately 4000 cm^{-1}, which is essentially equivalent to the fluorescent band reported for Burmese forsterite in the preceding GNI entry.

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Natural impregnation of a rock by copper minerals. Rough stone buyer Werner Spaltenstein recently sent a blue-green rock (figure 13) to the SSEF Swiss Gemmological Institute for identification. The material was purchased in Tanzania, but its original locality is unknown. The blue portions resembled lapis lazuli, while the green patches looked like chrysocolla. This contributor had two cabochons polished to evaluate its suitability as an ornamental stone (again, see figure 13).

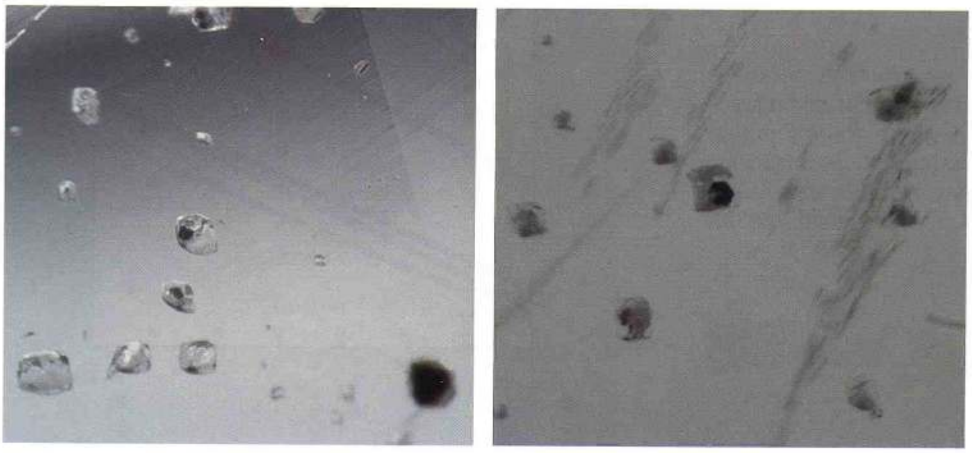

Figure 12. At higher magnification in diffused light, the inclusions forming the fingerprint in figure 11 were seen to consist of white solid phases (possibly within a liquid) and black particles. A hexagonal outline is evident for the black inclusion in the center of the right-hand photo. Photomicrographs by D. M. Kondo; fields of view 1.0 mm.

Viewed with low magnification, the material gave the initial impression of a color-treated coarse-grained igneous rock because of the numerous fractures and cleavage planes that were filled with a dark blue material (figure 14, left). With the client's permission, we prepared a petrographic thin section from the rock sample to analyze the component minerals and study their textural relationships (figure 14, right). Sodium-rich plagioclase, quartz, and muscovite mica were identified microscopically, and were confirmed via Raman spectroscopy. The blue material filling the fissures was not a dye but rather was identified as azurite; also present were malachite, chrysocolla, and chalcanthite. EDXRF chemical analysis showed Si, Al, Na, and some K and Ca. Copper was clearly present, as was Fe in low concentration.

The gemological properties of the material corresponded to the predominance of sodic plagioclase and quartz: The mean RI was 1.55, and the SG (by hydrostatic weighing of the large piece of rough in figure 13) was 2.69.

This ornamental material apparently formed when a plutonic rock was naturally fractured and impregnated with secondary copper minerals. "Jambolite" has been proposed as a trade name (*jambo* is a popular greeting in Swahili) for this colorful rock.

Henry A. Hänni

Figure 13. This feldspar-quartz-muscovite rock, sold in Tanzania, is naturally stained by secondary copper minerals. The blue color is due to azurite-filled veins, and the green is derived from malachite and chrysocolla. The cabochons are approximately 20 mm long. Photo by H. A. Hänni, © SSEF.

Update on the John Saul ruby mine, Kenya. In May 2008, this contributor and Dr. James E. Shigley of GIA Research visited the John Saul ruby mine, which is owned and operated by Rockland Kenya Ltd. in the Tsavo West National Park of southern Kenya. Our fieldwork was facilitated by Alice Muthama, director of Muthama Gemstones Ltd. in Nairobi. This report provides an update on underground mining activities and ore processing since the comprehensive Gem News entry on this deposit that was published by J. L. Emmett in the Winter 1999 issue of *Gems & Gemology* (pp. 213–215).

According to general manager Alfonse M'Mwanda and mine geologist/engineer Meshack Otieno, the underground mining began in late 2004, and is taking place in two locations on the property: the Kimbo shaft (in the former Kimbo pit), and the Gitonga shaft (in the former pit containing the Nganga and Miller open cuts; figure 15). The Kimbo shaft reaches a depth of 42 m and contains four levels of horizontal tunnels. It is currently the sole ruby producer, exploiting a mineralized zone that is 0.5–2 m thick. The Gitonga shaft is 21 m deep and contains one level. So far, no commercial ruby production has occurred from these exploratory workings but, according to old literature, good-quality stones were found in surface deposits in this area. Each shaft is joined to a separate ventilation shaft, and

Figure 14. At first glance (left), the rock appeared to contain a blue dye. Closer examination of a petrographic thin section with magnification (right) revealed the presence of azurite in veins crosscutting the feldspar-quartz-muscovite. Photomicrographs by H. A. Hänni, © SSEF; image width 5 mm (left) and image magnified 10× (right).