rich volcanic glass containing plagioclase and phyllosilicate inclusions, together with secondary calcite veins.

This ornamental rock makes an attractive addition to the gem market, especially as it is relatively tough and hard, and thus shows a high lustre combined with an attractive colourful brecciated texture.

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‘Ruby’-red Tourmaline from Nigeria

During the June 2015 JCK show in Las Vegas, Nevada, USA, Bill Barker (Barker & Co., Scottsdale, Arizona, USA) displayed some red tourmaline from a new discovery at the Oyo Valley deposits in Nigeria, which was notable for its ruby-like coloration. He obtained three large pieces of rough in April 2015 from his supplier in Lagos, Nigeria. Although the rough was dark, it was very red. Cutting of a piece that weighed 8.4 kg yielded 3,973 carats of faceted stones (not including melee from the offcuts) ranging from ~1 to 16 ct each. The final yield of 9.5% was far below the typical yield (13–16%) that Barker has obtained in the past from Oyo Valley Nigerian rubellite, and resulted from his choice to cut smaller stones (especially Portuguese-style rounds) so they would not appear overly dark. Also, only clean faceted stones and no cabochons were cut from the rough.

Barker assembled seven jewellery suites from this material (see, e.g., the cover of this issue), and also offered individual cut stones (Figure 15). They displayed an attractive red colour similar to Thai ruby—so much so that he displayed the rubellite next to Thai ruby at the JCK show (e.g. Figure 16). This coloration is rather distinct from the lighter pink to purplish pink hues that are typically shown by Nigerian tourmaline.

Brendan M. Laurs

Figure 15: These ‘ruby’-red tourmalines from Nigeria weigh 4.25–7.25 ct. Photo by Rich Barker.

Figure 16: The Nigerian rubellite on the left (2.71 ct) shows a similar coloration to the Thai ruby on the right (3.14 ct). Both gems were faceted by the same cutter as Portuguese-style rounds. Photo by Rich Barker.

Tremolite from Mwajanga, Tanzania

During the 2015 Tucson Gem shows, gem dealer Werner Radl of Mawingu Gems (Niederwörresbach, Germany) displayed a prismatic gem-quality crystal (Figure 17) that he obtained in Tanzania. It was sold to him as tourmaline, and reportedly came from a new find in the Mwajanga area (Manyara region of north-central Tanzania).

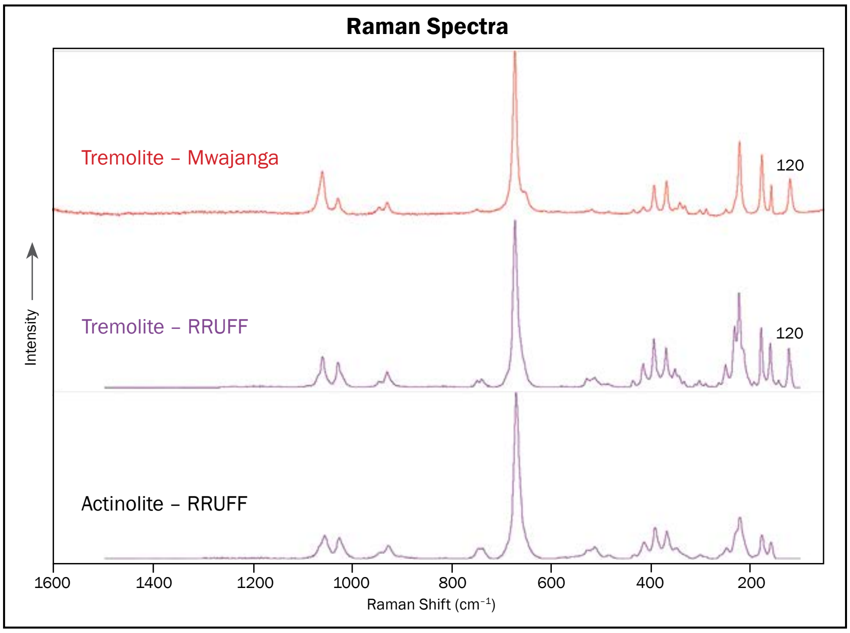
Figure 17: This prismatic crystal is gem-quality tremolite, an amphibole-group mineral. It measures 69.5 mm long and weighs 8.05 g. Photo by J. C. Zwaan.

The elongate crystal was transparent and had a light, slightly greyish, green colour. It weighed 8.05 g and measured approximately 69.5 × 9.37 × 5.48 mm. Both ends of the crystal were broken, and one end also displayed an area with a parallel fibrous structure. The surface of the crystal displayed fine striations along its length, and an incipient cleavage fracture was present in the same orientation. Another fracture positioned in the middle of the crystal was oriented almost perpendicular to the longitudinal direction. Inclusions consisted of parallel growth tubes and partially healed fissures.

One side of the crystal had been polished, but no clear readings could be obtained with the refractometer due to the poor quality of the polish. The hydrostatic SG was 2.99. With the dichroscope, weak trichroism could be observed: colourless, light yellowish green and light green. No fluorescence was observed to long- or short-wave UV radiation. Compared to amphiboles in the tremolite-actinolite-ferroactinolite series (Deer et al., 1997), the overall pale colour, relatively low SG and weak pleochroism corresponded to a member with a low iron content, and therefore suggested tremolite, rather than actinolite, as the identity of this crystal.

Raman analysis taken with 532 nm laser excitation revealed a spectrum that had closest matches to several reference spectra for tremolite in the RRUFF database (www.rruff.info). However, the Raman spectra of actinolite may be very similar, and therefore caution must be exercised when interpreting the spectra (Figure 18). The best match was to a tremolite spectrum that also showed a peak at 120 cm^{-1}. For most of the tremolite and actinolite spectra in the database, spectral features below 150 cm^{-1} were not recorded, and some of those tremolite and actinolite spectra were virtually indistinguishable.

Figure 18: The Raman spectrum of the crystal showed the best match with a tremolite spectrum in the RRUFF database, containing a distinct peak at 120 cm^{-1}. The crystal's spectrum also showed a good match with reference spectra for actinolite (e.g. bottom spectrum). Raman spectra of tremolite and actinolite may be very similar and therefore indistinguishable.



The compositional range of tremolite extends from $\square Ca_2Mg_5Si_8O_{22}(OH)_2$ (where $\square$ = a vacancy) to $\square Ca_2Mg_{4.5}Fe^{2+}_{0.5}Si_8O_{22}(OH)_2$, whereas actinolite extends from $\square Ca_2Mg_{\leq 4.5}Fe^{2+}_{\geq 0.5}Si_8O_{22}(OH)_2$ to $\square Ca_2Mg_{2.5}Fe^{2+}_{2.5}Si_8O_{22}(OH)_2$ (Leake et al., 1997; Hawthorne et al., 2012). Electron microprobe analysis of the crystal by one of the authors (FCH) confirmed that it was indeed tremolite: $(Na_{0.05}K_{0.03})(Ca_{1.94}Na_{0.06})_2(Mg_{4.85}Fe_{0.10}Mn_{0.01}Al_{0.03})_{4.99}Si_{7.99}O_{22}(OH)_{1.92}F_{0.08}$. This formula, with $Mg/(Mg+Fe^{2+}) = 0.98$ (cf. Leake et al., 1997) and with $^{A}(Na+K+2Ca) = 0.08$ and $^{C}(Al+Fe^{3+}+2Ti) = 0.03$ (cf. Hawthorne et al., 2012), shows that the crystal has a composition that is very close to the pure end-member composition of tremolite.

In July 2015, Radl reported that he obtained three more crystals of this tremolite from the same find. Also, his supplier indicated that a few kilograms of the rough tremolite were sold into the market as tourmaline. This is not surprising, given the similar appearance of this tremolite to some of the tourmaline that was recently mined from the Mwajanga area (e.g. www.minrec.org/pdfs/Toms%20Online%20report%2039.pdf).

Radl indicated that he encountered significant amounts of tremolite of the same pale green colour (associated with quartz and purple scapolite) during his first trip to Tanzania in 1995. The only other occurrences of gem-quality tremolite known to these authors are yellowish green material from Merelani, Tanzania (Fritz et al., 2007) and greyish green crystals from Bancroft, Ontario, Canada (www.youtube.com/watch?v=od4OfHsGQbg).

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DIAMONDS

Diamond Horse-head Carving

Sculpting and carving are very intricate and patience-consuming art forms. Numerous examples of sculptures and carvings created from stone and various gem materials are known worldwide, but hand sculpting of diamond is virtually unheard of (e.g. Fryer, 1983; Du Toit, 2009).

In January 2015, this author examined a unique two-headed horse sculpted from natural diamond (Figure 19). It was accompanied by GIA report no. 1209011703, certifying it as a carving weighing 4.07 ct that was made from near-colourless natural diamond. It measured 13.72 × 7.02 × 4.34 mm, and the two horse heads formed a perfect mirror image of one another. The carving was well proportioned with precise symmetry when viewed from any direction. Although designed to stand upright on its base, it was balanced with such precision that it would stand upside-down on the ears without toppling over (see Figure 19, centre). When the sculpture was observed in detail, the illusion of harness straps going across the faces of the horses could be seen.

The sculptor reportedly required more than a full year to plan and execute the carving. A paper