Figure 4: Deep purple apatite is associated with quartz and albite on this specimen (14 × 13 cm) from the Karibib area of Namibia. Specimen and photo courtesy of Hans Soltau.

to deep purple; some of them had a slight grey overtone. So far, most of the gems weigh <2 ct (eye clean to very slightly included), and only four eye-clean stones weighing >3 ct have been cut, including a top-colour 3.51 ct oval and a 7.27 ct

Figure 5: Weighing 7.27 ct, this eye-clean cushion brilliant is unusually large for purple apatite from Namibia. Photo by Jeff Scovil.

cushion (Figure 5). In addition, a parcel of small-sized material is being cut overseas.

The purple colour of this apatite is reminiscent of the classic material produced from the Pulsifer Quarry in Maine, USA (e.g. Manchester and Bather, 1918).

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Orange-Red to Yellowish Brown Cordierite from Madagascar

Gem-quality cordierite is typically seen as blue material (iolite), showing strong pleochroism in yellow, light blue and dark violet-blue. However, in late 2014 one of the authors (FP) learned about a new occurrence of a much different cordierite, which typically ranged from dark orange-red to yellowish brown. The material is recovered by local miners from weathered residual deposits in southern Madagascar, probably in the Gogogogo area, north of Ampanihy in Tuléar Province. One of the authors (FP) obtained about 120 kg of rough material of mixed quality from the miners over a period of a few months, from which only a few kilograms were suitable for cutting cabochons and faceted stones (e.g. Figures 6 and 7).

Three faceted stones weighing 2.55, 3.17 and 3.63 ct were characterized for this report (Figure 7). They displayed strong pleochroism, in (1) strong orange, (2) greyish purplish (red-) pink and (3) slightly brownish ('straw') yellow. The pleochroism

Figure 6: Cabochons cut from the new Madagascar cordierite show unusual orange-red to yellowish brown coloration. The total weight of the stones shown here is 45.18 ct. Photo by F. Pezzotta.

could clearly be observed with the naked eye, resulting in an overall dark, slightly brownish orange-red or yellowish brown depending on the viewing angle. RI values varied between 1.530 and 1.540, with n_α = 1.530, n_β = 1.533–1.534 and n_γ = 1.540, yielding a birefringence of 0.010. The optic sign was consistently biaxial positive, which differs from the common blue iolite (biaxial negative). Hydrostatic SG values were 2.53–2.55; these are at the low end of the known range for cordierite (2.53–2.78, cf. Deer et al., 1986). All samples were inert to long- and short-wave UV radiation. The stones were moderately included, mostly with partially healed fissures but also with irregularly shaped, breadcrumb-like inclusions and various mineral inclusions. Raman microspectroscopy using a Thermo DXR Raman microscope with 532 nm laser excitation identified the inclusions as follows: rounded and elongated—or thin, long prismatic—crystals of tourmaline; blocky and small rectangular-appearing grains of quartz; rounded crystals of apatite; a small platelet of phlogopite; and minute, parallel-oriented needles and small platelets, possibly rutile. Tiny fractures were seen along partially healed fissures and also adjacent to various mineral inclusions. Chemical analyses of the three samples by energy-dispersive X-ray fluorescence (EDXRF) spectroscopy showed major amounts of Mg, Al and Si, minor amounts of Fe, and traces of Mn. Energy-dispersive spectroscopy on a slab of the cordierite by author GRR using a scanning electron microscope showed similar composition. The optical spectrum showed features of Fe^{2+} found in blue cordierite, plus water-related absorptions in the near-infrared, but also a strong absorption band near 500 nm that is the cause of the unusual orange-red to yellowish brown colour.

Further information on this new cordierite will be reported in a future publication.

Figure 7: These three Madagascar cordierites (2.55–3.63 ct) were analysed for this report. Photo by J. C. Zwaan.

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