

Figure 23. These samples of dumortierite (2.06, 1.18, and 0.61 ct) are from Tunduru, Tanzania. Photo by H. A. Hänni; © SSEF.

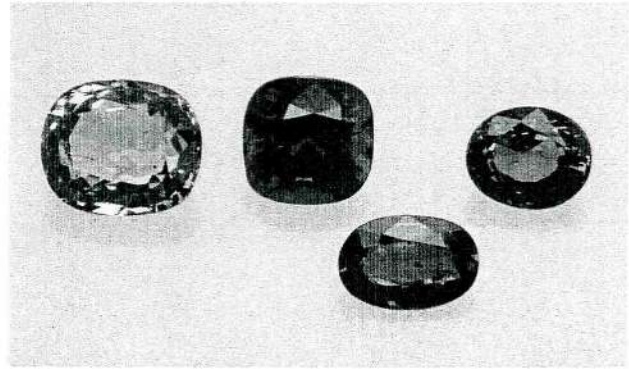


Figure 24. Tunduru is also the source of these sapphire gems (2.14, 1.55, 0.67, and 0.93 ct). Photo by H. A. Hänni; © SSEF.

described here is quite different from the yellow-orange to orange stones shown in that report.

Eric A. Fritz and Christopher M. Breeding
GIA Laboratory, Carlsbad

George R. Rossman
California Institute of Technology
Pasadena, California

Brendan M. Laurs

William B. (Skip) Simmons and Alexander U. Falster

Transparent dumortierite and sapphire from Tanzania.

From time to time, the SSEF Swiss Gemmological Institute receives rough material for identification, often as parcels of pebbles, crystals, and fragments. Rough stone buyer Werner Spaltenstein, based in Chanthaburi, Thailand, is one source of such material, mainly from East Africa and Madagascar. In these lots, we have identified a number of uncommon and rare minerals. Here we report on two such transparent minerals found in gravels from Tunduru, Tanzania.

Dumortierite, an aluminoborosilicate, is best known as a polycrystalline blue ornamental stone, often mixed with quartz. The new material from Tunduru, however, was transparent and colored violetish gray and brownish pink. The three waterworn pebbles were identified by their SGs and Raman spectra; after faceting (figure 23), we obtained RI and birefringence values that were consistent with dumortierite. The following properties were recorded on the faceted stones: pleochroism—strong, light gray to red (pink stone); RI— $n_{\alpha}=1.679$, $n_{\gamma}=1.709$; birefringence—0.030; SG—3.38–3.41; and UV fluorescence—inert to long-wave UV radiation and white to short-wave UV. The stones were nearly free of fluid or mineral inclusions. EDXRF analysis of all three samples showed major Al and Si, and traces of Ti and Ga in variable amounts (B cannot be detected by EDXRF); Ti is probably the chromophore of the pink stone.

Sapphirine, an aluminosilicate, is rarely transparent and is usually gray, green, or brownish violet. The samples from Tunduru consisted of four transparent waterworn pebbles ranging from gray to violet and red that came from parcels of rough spinel and sapphire. These samples were

also identified by their SG and Raman spectra and, after faceting (figure 24), they yielded RI and birefringence values that were consistent with sapphirine. The following properties were obtained: pleochroism—strong, light pink to dark red (red stone); RI— $n_{\alpha}=1.701$ –1.704, $n_{\gamma}=1.708$ –1.711; birefringence—0.007; SG—3.49–3.50; UV fluorescence—inert (gray-to-violet stones), and dull red to long-wave and weak orange to short-wave UV radiation (red stone). No inclusions were seen in any of the samples with a gemmological microscope. EDXRF analysis of all the stones showed major amounts of Mg, Al, and Si, and traces of Fe, Ti, Cr, and Ga. Their color range is most probably due to variable amounts of Fe and Cr, the latter element being the main cause of color in the red stone.

Dumortierite and sapphirine are rare as faceted gemstones, and the occurrence of attractive pink dumortierite and red sapphirine was particularly surprising.

Henry A. Hänni

Brazilian blue opal, with cristobalite and quartz. At the 2007 Tucson gem shows, Si and Ann Frazier (El Cerrito, California) obtained two cabochons of a new Brazilian "opal" and loaned them to GIA for examination. One weighed 6.77 ct and was banded in light blue, white, light brown, and gray, while the other was a 6.84 ct light blue stone (figure 25).

We obtained the following properties on the cabochons: diaphaneity—translucent; spot RI—1.44 (blue portions), 1.54 (wide central light brown band), and 1.50 (darker brown area near the end of the cabochon). Hydrostatic SG was 2.25 for the blue cabochon and 2.53 for the banded specimen. Both stones were inert to long-wave UV radiation. The blue areas showed chalky very weak green-yellow fluorescence to short-wave UV, while the brown bands fluoresced weak-to-moderate green-yellow (brightest at the white transition zone to the blue area in the banded cabochon). No distinct absorption features were seen with a desk-model spectroscope.

Microscopic observation of the banded sample revealed that the narrow brown layer that transitioned to the light blue region contained pale brown transparent spherules