Sapphires from Kina, Kenya

During the February 2014 Tucson gem and mineral shows, gem dealer Dudley Blauwet obtained from an African supplier a parcel of rough sapphires that reportedly came from Kina in central Kenya, about an hour's drive from Garba Tula. The parcel was particularly notable for its content of bicoloured sapphires, and Blauwet's quick visual comparison with the gem corundum from Kenya's Dusi deposit (near Garba Tula; see, e.g., Simonet et al., 2004) indicated that the present material was somewhat different. From 55 pieces of rough weighing 48.5 g, Blauwet had 57 stones faceted that weighed 83.54 carats and ranged from 0.40 to 2.40 ct. He loaned four samples to AGL for examination (Figure 14).

The three modified cushion cuts and one rectangular emerald cut ranged from 1.03 to 1.94 ct (6.50 × 4.41 × 3.30 mm to 7.85 × 6.36 × 4.23 mm, respectively). Viewed face-up with the naked eye, the stones appeared blue, green, yellow and bicoloured blue-yellow. However, when viewed with diffuse transmitted light in the microscope, they all showed exclusively blue and yellow colour zoning that was both straight and angular.

Visible-range spectroscopy using an S.I. Photonics CCD (charge coupled device)-array

Figure 14: Four sapphires (1.03–1.94 ct) from a relatively new deposit in Kenya were examined for this report: blue, green, yellow (here, appearing greenish yellow due to internal reflections from blue zones) and bicoloured blue-yellow. Photo by Kelly Kramer.

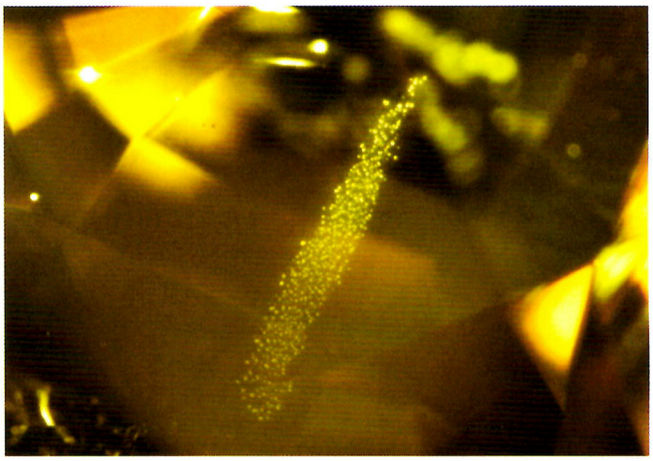

Figure 15: A planar cloud containing whitish, polka dot-like inclusions is seen in the 1.61 ct yellow Kenyan sapphire. Photomicrograph by Christopher P. Smith; magnified 50×.

UV-Vis spectrophotometer showed that all four sapphires were coloured by a combination of Fe^{2+}–Fe^{3+}, Fe^{3+} and Fe^{2+}–Ti^{4+}, and revealed they were of a magmatic-related origin (Smith, 2010), consistent with their overall blue-green-yellow coloration. Mid-infrared spectroscopy of the blue sapphire using a Thermo Scientific Nicolet 6700 FT-IR spectrometer displayed a strong 3309 cm^{-1} series of peaks (strong 3309, 3232 and 3185 cm^{-1}, and nominal 3367 cm^{-1}), while the yellow and green sapphires both showed a nominal 3309 cm^{-1} series (minor 3309 cm^{-1} and extremely small 3232 and 3185 cm^{-1}), while the bicoloured sapphire showed no OH-related features.

Semi-quantitative chemical analysis using a Thermo Scientific ARL Quant'X EDXRF spectrometer showed that all samples contained high amounts of Fe (0.91–1.68 wt.%), which is consistent with their magmatic-related origin. In addition, Ti ranged up to 0.01 wt.%. Neither V nor Cr was detected in any of the stones. Based on their high Fe content, it is not surprising that none of these four sapphires fluoresced to either long- or short-wave UV radiation.

Typical sapphire inclusions were observed in the four stones using a standard gemmological microscope. They consisted of bands of pinpoints (some coarse, some fine), strong straight and angular growth zoning, and a few frosty, whitish, fine-grained 'fingerprints'/healed fissures. Some of the more intriguing inclusion features were found in the yellow sapphire. The largest yellow colour zone in the stone contained an elongate planar cloud consisting of whitish, polka dot-like inclusions, as well as minute spots (Figure 15).

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