Gem Notes

COLOURED STONES

Colourless Cat's-eye Apatite from Brazil

Intense blue apatite is known from Minas Gerais, Brazil, and cat's-eye stones in yellow and green have also been documented from this gem-rich country (O'Donoghue, 2006). In addition, a small amount of colourless cat's-eye apatite was recently produced, and shown to this author at the recent Tucson gem shows by David Epstein (Precious Resources Ltda., Teófilo Otoni, Brazil). He reported that the material was found in January 2013, and came from a parcel consisting mainly of greenish blue cat's-eye apatite. Some of the rough was colour zoned, and the colourless portions were polished into 40–50 pieces ranging from 1 to 4 ct (e.g. Figure 1), for a total of approximately 100 carats. The material is known to have been cut in Teófilo Otoni, but the origin of the unusual rough material within Brazil is unknown.

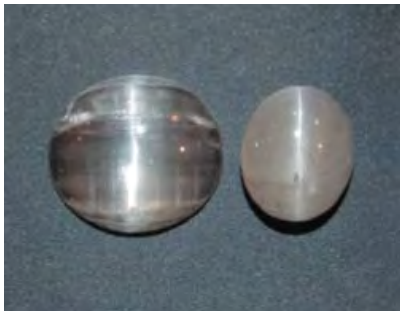

Figure 1: These cat's-eye apatites (2.45 and 3.80 ct) from Brazil are colourless, which is highly unusual for this material. Photo by B.M. Laurs.

Brendan M. Laurs

Reference

O'Donoghue M. (Ed.), 2006. *Gems,* 6th edn., Butterworth-Heinemann, Oxford, 382–384.

Prismatic Aquamarine Crystals from Ethiopia

Aquamarine has been mined from southern Ethiopia since at least 2010, but typically only a small proportion is of gem quality (Laurs et al., 2012). This is apparently because much of the production comes from crystals that were 'frozen' within pegmatite (rather than forming in open cavities) and therefore have low transparency. Most of the aquamarine has been recovered as broken pieces, some rather large.

Figure 2: These aquamarine crystals were reportedly produced in Ethiopia in mid-2012. They range from 3.5 to 7.5 cm long. Photo by B.M. Laurs.

During the September 2013 Hong Kong gem show, Farooq Hashmi showed this author some more recent production of Ethiopian aquamarine that was quite different from material seen in the past: the crystals were prismatic, well formed, and of fine gem quality (e.g. Figure 2). He first encountered this aquamarine during the September 2012 Hong Kong show, when he obtained approximately 2 kg of the better crystals from a parcel weighing 20–25 kg; about 30% of that parcel showed good transparency. He was told that the aquamarine was produced in mid-2012. Most of the crystals were partially covered with a hard coating that appeared to consist of iron-stained clay.

During a January 2013 buying trip to Ethiopia, Hashmi encountered more of these prismatic aquamarine crystals, with the same hard coating mentioned above. However, these were much smaller, ranging from 2 to 3 cm long and 2–4 mm in diameter. The parcel weighed a total of about 2/3

kg, and most of the crystals were <1 g. Although too small for cutting gemstones, they could make attractive pendants for jewellery.

Brendan M. Laurs

Reference

Laurs B.M., Simmons W.B. and Falster A.U., 2012. Gem News International: New gem discoveries in Ethiopia. *Gems & Gemology,* **48**(1), 66–67.

Blue Chrysocolla Chalcedony from Peru

In mid-2012, gem dealer Hussain Rezayee (Rare Gems & Minerals, Beverly Hills, California, USA) obtained some newly produced 'gem silica' from the Arequipa region of southern Peru. This area is known to produce fine-quality gem silica (chrysocolla chalcedony) that is typically greenish blue to blue-green (e.g. Hyrsl, 2001; Emerson and Darley, 2010). However, this newer material was bluer than previously reported. Rezayee obtained additional material on another trip to Peru in May 2013, bringing his total amount to 183 kg in various grades. He was told that the blue gem silica was found at the bottom of a mine shaft, and was completely worked out by the miners. Pieces weighing up to 58 kg were recovered, with gem-quality samples of 750+ g. None of the material is known to have undergone any treatment.

Rezayee initially cut 22 cabochons weighing 2.49–22.02 ct, and he loaned three samples for characterization (18.07–22.02 ct; Figure 3). Examination by one of us (BC) showed the following properties: colour—light greenish blue to blue; diaphaneity—opaque; lustre—waxy, dull; RI—1.55 (spot method); hydrostatic SG—2.58–2.61; Chelsea colour filter reaction—none; and fluorescence—inert to long-wave and zoned chalky bluish white to short-wave UV radiation. The zoned fluorescence was apparently due to the local presence of an unidentified impurity mixed with the silica. However, when the fluorescent areas were analysed with Raman spectroscopy, the signal was overwhelmed by the quartz matrix. Ultraviolet-visible–near infrared (UV-Vis-NIR) spectroscopy showed a broad absorption band from approximately 430 to 530 nm (Figure 4). Chemical analysis by energy-dispersive X-ray fluorescence (EDXRF) spectroscopy showed only Si and Cu as major elements. These properties (other than the short-wave UV fluorescence) are consistent with those reported for chrysocolla and quartz by O'Donoghue (2006).

Microscopic examination revealed a polycrystalline texture consisting of minute blue and white interlocking crystals. Magnification also showed faint colour banding of lighter and darker blue layers. Small yellow and dark-appearing discolorations were disseminated throughout the stones, and were probably due to epigenetic staining and inclusions.

Figure 3: These cabochons of blue chrysocolla chalcedony (18.07–22.02 ct) were cut from material recently produced in southern Peru. Photo by Bilal Mahmood.

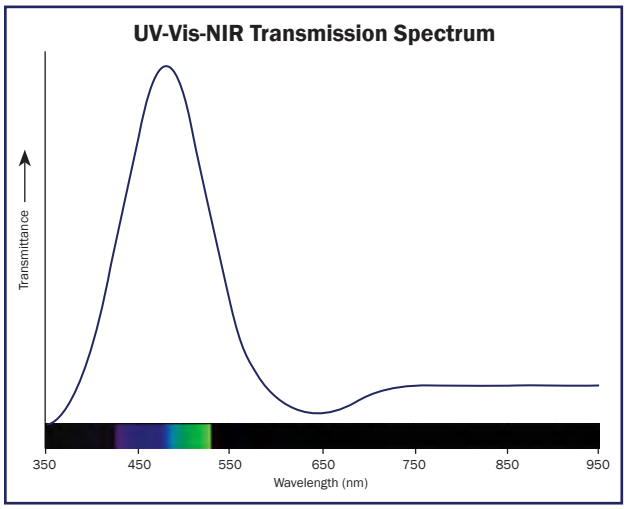

Figure 4: A broad transmission band extending mainly from approximately 430 to 530 nm was recorded in the UV-Vis-NIR spectrum of the chrysocolla chalcedony, which is consistent with copper as the chromophore for this material.