

Cobaltocalcite or Cobaltoan Calcite: A Swiss Answer

Switzerland is not known for its gem production, but rather as an important platform for trading, auctioning and certifying gems. However, at the May 2019 GemGenève fair (Geneva International Gem and Jewellery Show), a new Swiss gem material debuted in the designer area. Geneva-based art jeweller Grégoire Maret (Pierre d'Alexis S.A.) presented pink to purplish pink cobaltoan calcite from Switzerland—marketed as 'Rose of Mine'—in his handmade jewellery creations (e.g. Figure 7).

Cobaltoan calcite, $(\text{Ca},\text{Co})\text{CO}_3$, is rarely seen in high-end jewellery, and is rather unusual in its nature and geological origin. It is coloured by traces of Co^{2+} in octahedral coordination within the calcite structure (Fritsch & Rossman 1987), and may show variations in saturation and hue. The Swiss rough material, previously described by Meisser (1999), is sporadically extracted from abandoned coal mines situated near the village of Isérables in the canton of Valais in south-west Switzerland. The gemmy material is polished *en cabochon*, and so far approximately 30 stones have been cut, ranging from 5 to 35 ct.

This attractively coloured calcite variety formed under unique conditions. Following the cessation of coal mining in 1943, surface waters interacted with the surrounding rocks, and the cobaltoan calcite crystallised at ambient temperature and pressure through the percolation of fluids enriched with Co, Ni and Zn (Meisser 1999), forming speleothems on black shale host rock (Figure 8) in the moist darkness of the abandoned coal mines.



Figure 7: A free-form cabochon of translucent cobaltoan calcite from Switzerland is set in this pendant (5 cm long) by Grégoire Maret (Pierre d'Alexis S.A.), which is called 'L'Inattendue'. In the background is a piece of the rough speleothem on the host rock. Photo by David Fraga.



Figure 8: A speleothem (3 cm tall) of Swiss cobaltoan calcite is shown on its black shale host rock. (The white material in bottom-centre is a later generation of calcite.) Photo by Alain Pitteloud.

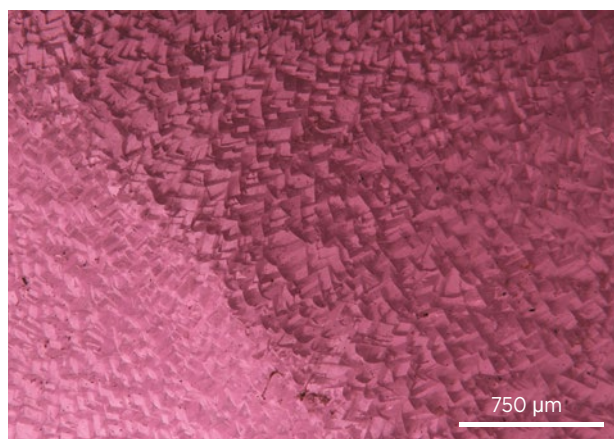


Figure 9: Aggregates of trigonal crystals are seen on the surface of the rough cobaltoan calcite. Photomicrograph by F. Notari.

Standard gemmological testing of this strongly birefringent polycrystalline material revealed RIs of 1.49–1.66 and a hydrostatic SG value of approximately 2.70. Only a very weak purplish luminescence was observed with long-wave UV radiation and the material was inert to short-wave UV. Under magnification, it showed a granular to fibrous appearance and columnar growth with inhomogeneous colour distribution resulting from the presence of remnants of the black shale host rock. The surface of the piece of uncut rough material we examined exhibited trigonal prismatic crystals without preferential orientation (Figure 9), resulting in a generally botryoidal form and making it tougher than monocrystalline calcite.

We identified the material as calcite (rather than aragonite) using infrared specular reflectance. The UV-Vis-NIR