

which are caused by oils (Guillen & Cabo 1997). This indicates that the blue dye in the fibres/tubes was introduced via an oil.

When the seller was informed about the true identity of the piece, he refused its return, claiming that the stones had been switched by the authors. Fortunately, the authors had fully characterised the piece and matched it to the details and images that were used by the seller online, so a refund was provided by the financial institution used for the transaction. A quick online search for similar pieces revealed that the same seller had previously sold another pin with a very similar-looking yellow-green chatoyant cabochon declared as cat's-eye chrysoberyl.

This case—not an isolated event—demonstrates how important it is to verify your purchases, no matter how authentic they look. Camouflaging gem scams in antique jewellery (the metalwork appeared authentic) can be an effective means for getting away with such dishonest transactions. It is important to remember that not only can stones be remounted in antique jewellery

in order to deceive, but also that glass and dyed gems have been used since antiquity, and various synthetics have been in circulation since the late nineteenth and early twentieth centuries.

Dr Thomas Hainschwang FGA  
([thomas.hainschwang@ggtl-lab.org](mailto:thomas.hainschwang@ggtl-lab.org))  
and Gianna Hainschwang  
GGTL Laboratories Liechtenstein  
Balzers, Liechtenstein

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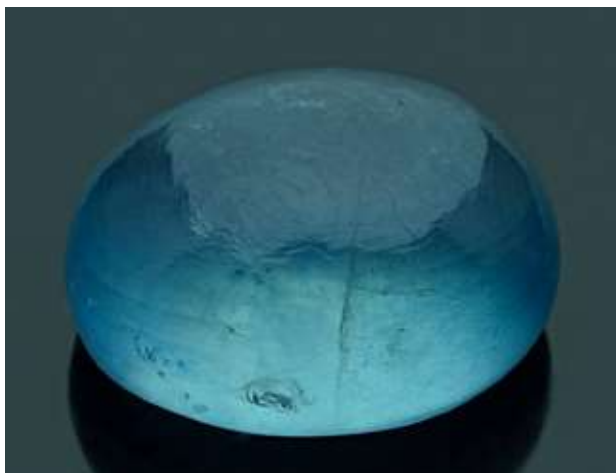
## TREATMENTS

### Stabilised Aquamarine Cabochon with Unusual Colouring

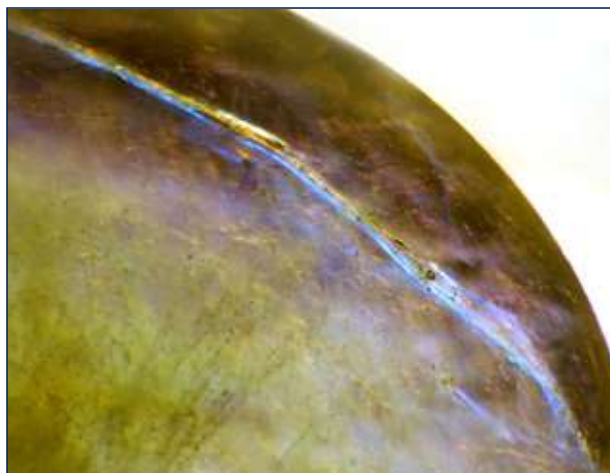
Recently, the authors examined a 17.20 ct greenish blue oval cabochon that exhibited a noticeably blurry, uneven colour distribution (Figure 18). It had a spot RI of 1.57, as measured with a standard gemmological refractometer, and a hydrostatic SG of 2.60. Ultraviolet-visible-near infrared spectra obtained with a GL Gem Spectrometer were consistent with that of natural beryl, specifically aquamarine. Its identity as beryl was further confirmed

by Raman spectroscopy (using a Magilabs GemmoRaman spectrometer with a 532 nm laser), but the reason for the unusual blurry colour distribution required further testing.

Examination with a standard gemmological microscope revealed clearly visible blue, pink and yellow flash effects, as well as gas bubbles, along the fissures throughout the stone (Figure 19). Testing with long-wave (356 nm) and



**Figure 18:** This 17.20 ct aquamarine cabochon displays an atypically blurred colour distribution due to a significant amount of fracture filling with resin. Photo by Q. Wang.



**Figure 19:** Resin-filled fissures in the aquamarine show characteristic blue, pink and yellow flash effects, as well as a gas bubble. Photomicrograph by Q. Wang; magnified 32×.



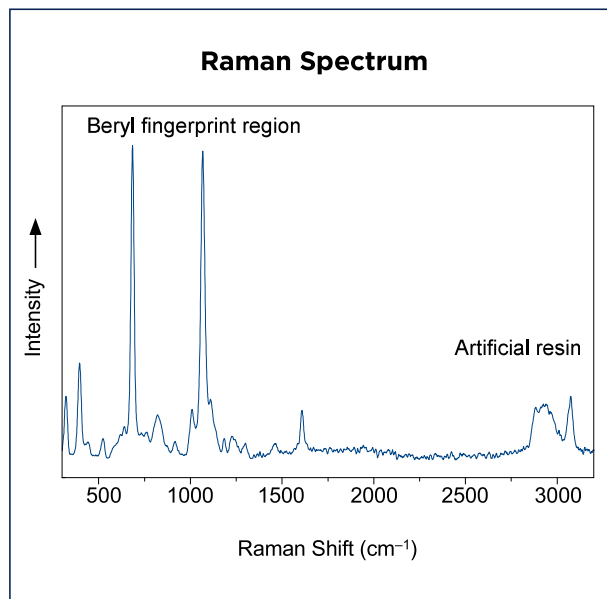
**Figure 20:** The 17.20 ct aquamarine cabochon displays web-like bluish white fluorescence patterns corresponding to the resin-filled fissures when viewed with long-wave UV radiation. Photos by Q. Wang.

short-wave (254 nm) UV radiation revealed a distinct web-like bluish white fluorescence along the fissures throughout the stone, with stronger luminescence to long-wave UV (Figure 20). These properties are diagnostic of clarity enhancement (e.g. Stephan *et al.* 2019).

The stone's relatively low SG of 2.60 (compared with the typical value for aquamarine of approximately 2.70) is another indication of fissure-filling with some kind of polymer (Stephan *et al.* 2019; Cao *et al.* 2023). Raman spectroscopy on predominantly fissured areas of the sample confirmed the presence of an artificial resin (Figure 21). Similar resin-filled aquamarines have been described previously (e.g. Li *et al.* 2009; Stephan 2019; Stephan *et al.* 2019; Jia *et al.* 2021). The unusual colour

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**Figure 21:** The Raman spectrum of a fractured area of the aquamarine cabochon shows typical beryl peaks (the 'fingerprint region'), as well as features due to artificial resin between 2800 and 3100  $\text{cm}^{-1}$ .

appearance of the present stone is due to the strong flash effects combined with the blue body colour of the aquamarine.

Due to the amount of artificial resin in this aquamarine cabochon, it should, in the authors' opinion, correctly be described as 'stabilised', or in accordance with the Laboratory Manual Harmonisation Committee's recommendations (LMHC 2023) as 'aquamarine with resin'.

Christine Matter ([c.matter@dgemg.com](mailto:c.matter@dgemg.com)) and Qi Wang  
German Gemmological Association  
Idar-Oberstein  
Germany