

Quartz Imitation of Star Sapphire

In late 2013, a 7.65 ct oval blue cabochon displaying asterism (Figure 25) was submitted to American Gemological Laboratories for a report. The client believed it was a star sapphire. Initial visual observation showed that the bottom of the cabochon was flat, whereas most star sapphires have a convex bottom (to retain weight, in light of their high value), so this was our first indication that something was amiss. Also, there was no visible parting in the sample, another common feature of star sapphire. Most importantly, the base of the cabochon was coated with a grainy blue material. Observing the stone in profile view showed that it was actually colourless (Figure 26), and the basal coating was the source of its blue colour when viewed face-up.

Visible-range spectroscopy showed cobalt-related features, rather than the standard iron absorption typically seen in blue sapphire. Chemical analyses of the coating with EDXRF

spectroscopy detected high concentrations of Pb and traces of Co. Microscopic observation of the colourless dome revealed small colourless

Figure 25: This 7.65 ct imitation resembles a star sapphire, but actually consists of colourless natural star quartz with an amorphous blue coating on the base of the cabochon. Photo by Bilal Mahmood.

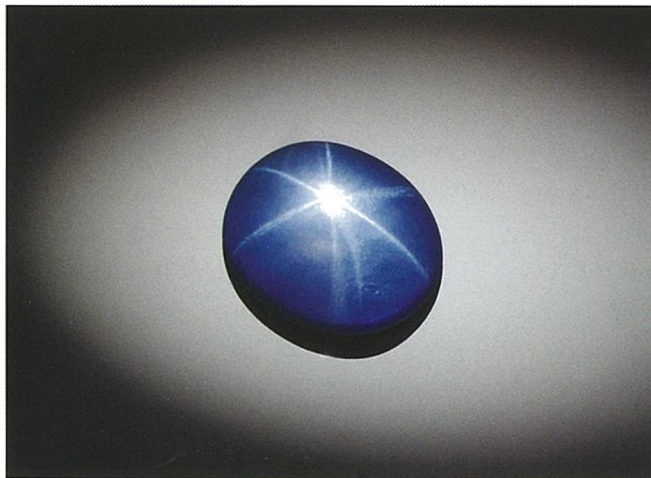




Figure 26: In profile view, it became apparent that the cabochon in Figure 25 is actually colourless. The blue colour viewed face-up is due to a coating on the bottom of the cabochon. Photo by Kelly Kramer.

inclusions and/or negative crystals, primary fluid inclusions and tiny, very fine, oriented needles (which caused the asterism). The cabochon was transparent to semi-transparent, and a bull's-eye optic figure was easily detected using a standard polariscope. Together with a spot RI reading of 1.54, the microscopic features and optic figure

were consistent with natural star quartz. Mid-IR spectroscopy confirmed this identification.

We concluded that this cabochon consisted of natural, colourless star quartz that had been backed with a lead-based amorphous material that was coloured blue by cobalt. A similar cabochon, consisting of enamel-backed star quartz, was reported by Krzemnicki and Hänni (2001).

The spot RI reading and bull's-eye optic figure, along with the lack of parting and the blue coating on the flat bottom of this cabochon, made this imitation detectable even without advanced testing equipment. This piece serves as a reminder that careful observation and basic gemmological testing remain effective for detecting certain limitations.

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Reference

Krzemnicki M.S. and Hänni H.A., 2001. Gem News International: Enamel-backed quartz as a star sapphire imitation. *Gems & Gemology*, **37**(2), 155.