

by the mollusc. Subsequently, the coral branch was apparently dissolved, possibly through the action of enzymes produced by the host clam that entered through the holes in the object's surface, leaving an extraordinary envelope of calcium carbonate.

Technically we could call this object a natural baroque porcelaneous hollow pearl, and its rarity and probable origin make it a real treasure.

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TREATMENTS

Quartz Beads Treated with a Coloured Polymer to Imitate Tourmalinated Quartz

During the February 2016 Tucson gem shows, these authors acquired a strand of unusual beads (Figure 28). The vendor was unsure of their identity, but thought they consisted of quartz that was untreated. At first glance they appeared to be tourmalinated quartz, although the high concentration of greenish blue inclusions in some of the beads would be unusual for tourmaline needles in quartz. The dealer had several hanks of these beads in various sizes (8–12 mm in diameter), and one strand was purchased for testing.

The beads were approximately 10 mm in diameter and showed varying degrees of translucency. The deep greenish blue needle-like inclusions were concentrated in various amounts (Figure 29). Raman analysis with an Enwave 785

micro-Raman spectrometer confirmed the beads were quartz (463 cm^{-1} Raman peak), but the inclusions did not yield a useful signal, even where they reached the surface of the beads. During a prolonged reading, the Raman's 785 nm laser caused smoke to emanate from one such inclusion, suggesting the presence of a hydrocarbon. Using a PerkinElmer Spectrum100 Fourier-transform infrared spectrometer, a coloured polymer substance was confirmed in the inclusions, with bands at 4060 , 3055 and 3037 cm^{-1} . Microscopic inspection revealed many of the needles were hollow, with their surfaces coated by the coloured polymer, while the polymer appeared to completely fill the finer tubes (e.g. Figure 30, left). Colour concentrations along fissures in a few of the beads (e.g. Figure

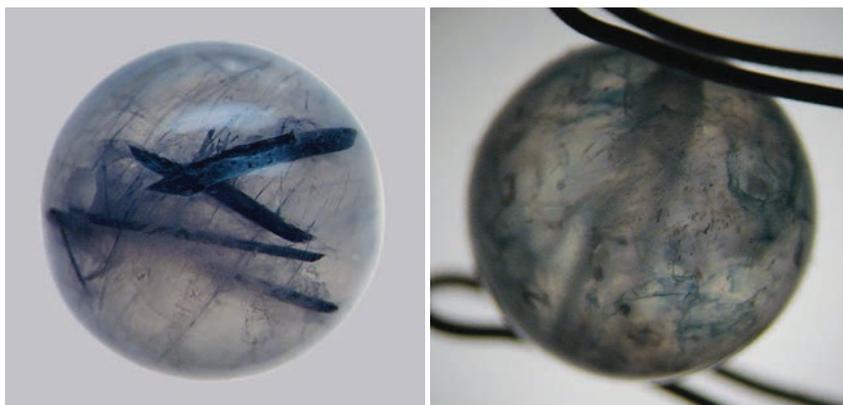


Figure 28 (left): These 'tourmalinated' quartz beads (10 mm in diameter) were studied for this report. Photo by C. Williams.

Figure 29 (below): The quartz beads contain varying amounts of deep greenish blue needle-like inclusions and colour concentrations. Photo by C. Williams.



Figure 30: The surface-reaching inclusion in the bead on the left was found to consist of a hollow etch channel that contained coloured resin. In a few of the beads, the coloured polymer also penetrated surface-reaching fissures, as shown on the right. Photos by C. Williams; both beads are 10 mm in diameter.



30, right) also indicated the presence of an artificial dye. In places, air bubbles were visible within the filled fissures when viewed with higher magnification.

We concluded that the beads consisted of quartz with hollow etch channels and fissures that were filled with a deep greenish blue resinous dye.

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