

# On the nature of blue rose quartz

Karen E. Fox<sup>1\*</sup>, Andrew M. McDonald<sup>2</sup>, Chris Yakymchuk<sup>1</sup>

<sup>1</sup> Earth and Environmental Science, University of Waterloo, Waterloo, Canada; \*kefox@uwaterloo.ca

<sup>2</sup> Harquail School of Earth Sciences, Laurentian University, Sudbury, Canada

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## Introduction

Over the past several years, the market for pink-coloured rose quartz has been augmented by variants ranging from colourless through deep rose-pink, to lavender and blue. The blue material has been available since at least 2021, and internet sources refer to it as rose quartz because it occurs in the same deposits as common rose quartz and because it sometimes shows hints of pink colour (MysticCrystals, 2023). This study probes the definition of rose quartz in the context of how it is currently represented on the market. Materials and methods

Five polished hand-specimens of blue rose quartz, three of which are depicted in Fig. 1, were compared with a variety of polished cobbles of pink-coloured semi-transparent “standard” rose quartz from Madagascar. Three of the blue specimens were labelled as “mined in Brazil”, another was said to come from Madagascar, and the last was of unknown provenance. All were visually assessed and examined with a calcite dichroscope. Petrographic thin sections on glass slides without cover slips were prepared from blue rose quartz BRQ1 and from a standard rose quartz RQ1 and

inspected using a Nikon Eclipse LV100Pol petrographic microscope.

## Observations

All “blue” specimens appeared almost opaque, with an unsaturated, bluish grey, muddy colour when illuminated from the front or side on black background with minimal backlighting (Fig. 1). When photographed on white as shown in Fig. 2, the blue cast was minimized and hints of pink could be discerned in BRQ1 and BRQ2, while transmitted light produced a strong orangish yellow colour reminiscent of that seen in opalescent glass (Fig. 3). When fracture-free areas of blue quartz were probed with a He-Ne laser, a clearly visible light path was evident. Standard rose quartz specimens varied in transparency but were never as turbid and never showed the transmitted yellow to the same extent as the blue rose quartz, and did not scatter the laser beam as much. In the three most transparent blue cobbles, a silky reflected “cats-eye” line and hints of asterism were detected.



Figure 1. Blue rose quartz on black with illumination from the left front.



Figure 2. Blue rose quartz on white with top and side illumination.

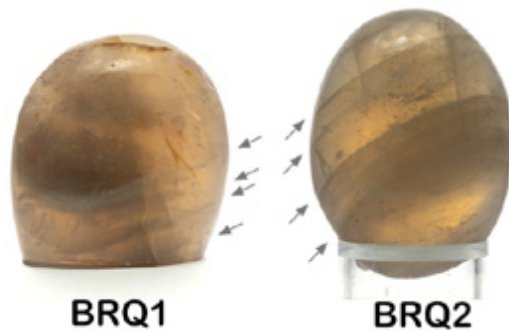


Figure 3. Light transmitted through blue rose quartz is a strong orange-yellow colour. Arrows indicate parallel planar fractures.

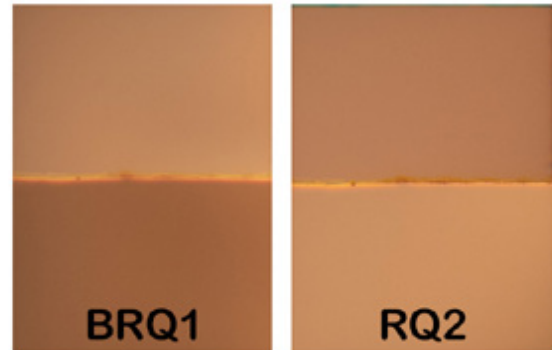


Figure 4. Dichroism in blue BRQ1 (left) and RQ2, a “standard” rose quartz (right).

Dichroscope examination of the transparent blue rose quartz specimens revealed two distinct colours that matched well with the dichroism of a distinctly coloured standard rose quartz, RQ2 (Fig. 4). In general, the blue rose quartz examined here was quite fractured, often displaying partially healed parallel planar fractures as indicated by arrows in Fig. 3.

Figures 5a and 5b show thin sections from blue and pink specimens, respectively, viewed between crossed polars. The blue rose quartz showed signs of dynamic recrystallization evidenced by a complex texture of small subgrains with diffuse boundaries aligned as indicated by the arrow in the figure, the largest averaging around 0.7 mm x 0.5 mm. The

rose quartz showed fewer and much larger subgrains with only faint signs of directional structure. Both specimens contained abundant fibres oriented in three directions consistent with hexagonal axes, as revealed in Fig. 6a and Fig. 6b. The length of fibres was limited by cutting orientation and how parallel they were to the polished surface of the slide. Lengths up to 0.86 mm were measured on the rose slide, and up to 0.17 mm for the blue. Preliminary fibre counts suggested a density around 2500 fibres/mm<sup>2</sup> for blue rose quartz and about 1800 fibres/mm<sup>2</sup> for the rose quartz. A high density of pinpoint inclusions, barely visible at 500x magnification in Fig. 6a, accompanied by slightly larger more visible dark granules, was observed on the blue rose quartz slide and to a far lesser extent on the standard rose quartz slide.



Figure 5a. Blue rose quartz thin section between crossed polars. The arrow indicates a directionality to the texture.

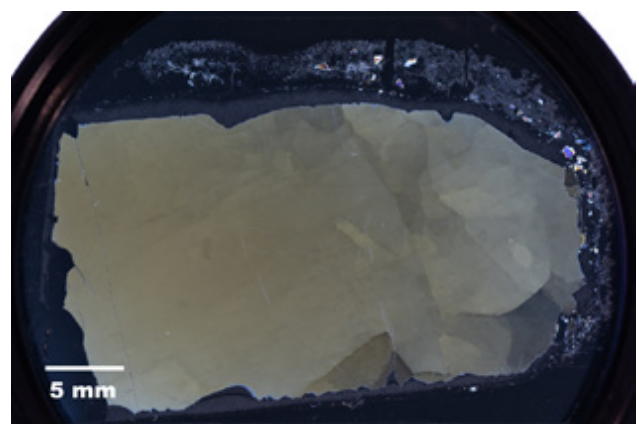


Figure 5b. “Standard” rose quartz thin section between crossed polars.

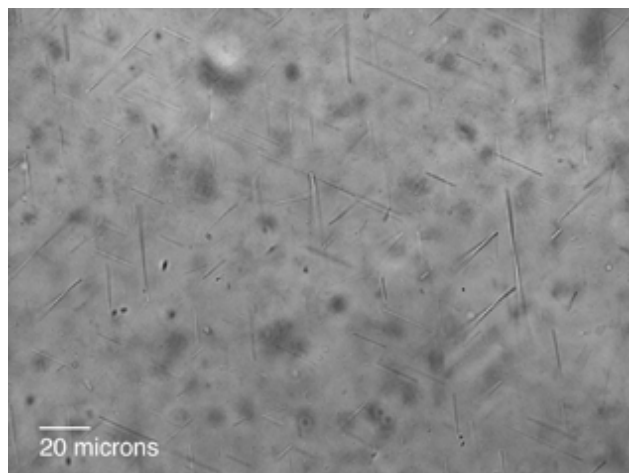


Figure 6a. Oriented fibres with granular and pinpoint inclusions in blue rose quartz.

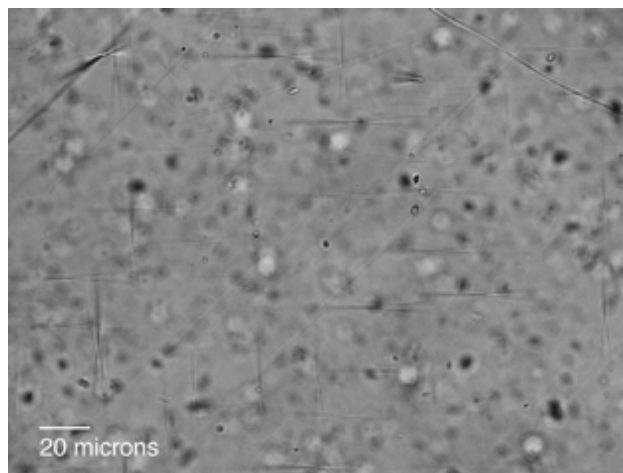


Figure 6b. Oriented fibres and granular inclusions in pink rose quartz.

## Discussion and further investigation

The presence of oriented fibres in this blue rose quartz, along with hints of pink colour in some specimens, prompts comparison with the dumortierite-like fibres identified by Ma *et al.* (2002) as the cause of colour in pink rose quartz. The overall hazy blue colour with a transmitted yellow colour, plus the Tyndall scattering effect that makes the laser beam visible (Kerker, 1991), combined with the observed high density of almost invisible pinpoint inclusions, all suggest that the dominant blue is due to scattering phenomena as postulated by Seifert *et al.* (2011) for other examples of blue quartz. The similarity of the dichroism shown by the blue rose quartz to that in the standard rose quartz is consistent with reports that “even rather

pale rose quartz may show medium to strong dichroism” (Liddicoat, 1989). However, since scattering phenomena polarize light (Strutt, 1919), the relative contribution of dichroic fibres versus scattering to the dichroism requires clarification. The muddy colour of this blue rose quartz may be linked to the yet-to-be-determined size distribution of pinpoint and granular particles present. Particles below and at the resolution of the microscope may contribute the blue, while larger ones may scatter white light or even act as absorbers. Beyond colour, the eye-visible fracturing and the nature of the quartz microstructures observed in the thin sections opens avenues for understanding temperatures and strain states associated with the deformational history of the deposits that sourced these quartz specimens.

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