

Asterism in the Idaho star garnet

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The Idaho star garnet occurs 40 miles northeast of Moscow and is the state gemstone of Idaho. The cause of asterism in this unique gemstone is not thoroughly understood. Figure 1 shows photographs of a 40 cm polished sphere of star garnet in different orientations: (A) shows a 6-ray star observed down a 2-fold axis and (B) shows a 4-ray star observed down a 4-fold axis. We found the asterism was produced by linear inclusions aligned along the four [111] directions (Figure 2).

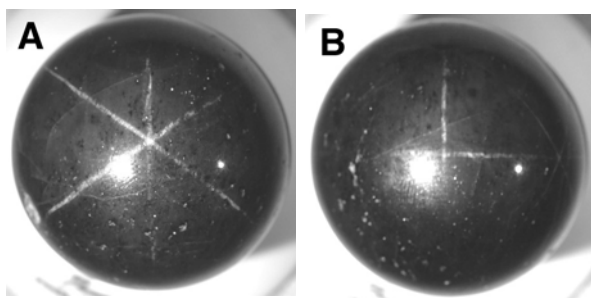


Figure 1.

Figure 2 shows photomicrographs (approximate field of view 10 microns) of inclusions matching the orientations in Figure 1. Two of the inclusions in Figure 2A are in the plane of projection, while the horizontal one is inclined to it, as are both of the inclusions in Figure 2B. These inclined inclusions produce weaker asterism, as shown in Figure 1.

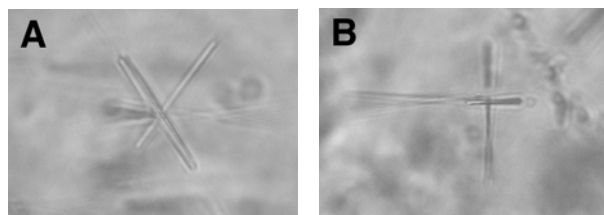


Figure 2.

Raman spectroscopy revealed some of the inclusions are voids and others are rutile.

Sapphires from Kimmirut, Baffin Island, Nunavut, Canada

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Recently, gem-quality blue and yellow sapphires were discovered near Kimmirut on the south coast of Baffin Island. The original "Beluga" occurrence contains deep blue sapphires with violet overtones. Single crystals up to 7.7 x 2.1 cm have been recovered. Most sapphires are color-zoned, and may display concentric, irregular, or end-to-end variations in hue. EMP analyses of 10 sapphires yielded maximum TiO₂ and FeO values of 0.13 and 0.30 wt.%, respectively. The dominant chromophore in yellow sapphires from "Beluga South" is iron, with up to 0.04 wt.% FeO.

Sapphires are hosted by calc-silicate lenses in a marble unit of the metasedimentary Lake Harbour Group, near a major terrane boundary within the 1.8 Ga Trans-Hudson Orogen. Beluga sapphires occur with plagioclase, clinopyroxene, phlogopite, muscovite, calcite, graphite, nepheline and scapolite. Accessory minerals are apatite, rutile, titanite, and zircon, and rare phases include chlorite, dravite, monazite, sanbornite, thorianite, and uraninite. This diverse mineral suite formed during retrograde metamorphism accompanied by multi-stage fluid infiltration. A U-Pb zircon age of 1783 Ma indicates P-T conditions during zircon formation were < 710°C and 6 kbar, the regional P-T conditions at the end of terminal continental collision in Trans-Hudson Orogen at 1795 Ma. The tectonic setting is analogous to gem-producing areas within the India-Asia collision zone. South Baffin also hosts other gem minerals in complexly deformed, high-grade metamorphic rocks. These include diopside, pargasite, garnet, spinel, scapolite, tourmaline, apatite, zircon, moonstone, and lapis lazuli.