

TWELVE-RAYED STAR SAPPHIRE OF INTEREST

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Figure 1: The well-defined and symmetrical star in this 12-rayed star sapphire is of special note.

Star sapphires are submitted to the laboratory on a regular basis and black or golden twelve-rayed stars from Thailand are not uncommon, but when this dark purple twelve-rayed star sapphire was submitted to the laboratory for identification recently it attracted our attention.

Within some sapphires rutile and hematite crystallize as inclusions in the form of very small needles and “arrowheads” or “platelet” inclusions. These inclusions run in three directions, parallel to the edges of the prism, within the basal plane. Hematite forms parallel to the first-order hexagonal prism while rutile is found on the second-order hexagonal prism. (Webster, R., 1994) If a stone contains a sufficient amount of rutile a six-rayed star is formed. If both hematite and rutile are present, a twelve-rayed star may be present.

A spot refractive index taken during the routine gemological examination was determined to be approximately 1.760 and the specific gravity taken by the hydrostatic method was found to be 4.0, which is consistent with sapphire. Microscopic examination using a standard GIA gemological microscope with magnification ranging from 10 to 60 times revealed a magnificent array of internal inclusions. Densely packed brownish rutile needles and silk with arrowhead inclusions and thin films or platelets were observed along with small rounded colorless crystals with small tension fractures associated. In addition, orangish irregular crystals were also observed (Figure 2).

Using a Renishaw inVia Raman microscope fitted with a 514nm Argon Ion laser a spectrum was taken on one of the irregular orangish crystals that was cut through on the surface of the stone. The spectrum matched with feldspar in the GIA Raman Spectra Database.



Figure 2: Orangish irregular crystals (probably feldspar) observed in a twelve-rayed purple star sapphire

References

Webster, R. (1994) *Gems, Their Sources, Descriptions and Identification*, page 86, 5th. Butterworth-Heinemann, Oxford,