



LAB UPDATE

RARE PINK POUURETTEITE

By GIT-Gem Testing Laboratory

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Introduction

Gemstones are minerals that can be decorated by polishing and cutting for used as a jewelry. Important gemstone are trading well in the gemstone market, which normally called precious stones, such as Diamond, Corundum and Beryl. The other semiprecious stones are amethyst, garnet, feldspar etc.

In a perception of people, precious stones are always felt more valuable, more expensive than semiprecious stones, but this is not always the truth because there are some stones have more valuable than the expectation which are called rare gems such as taaffeite, musgravite, paraiba tourmaline, benitoite, jeremejevite, sugilite, and pouuretteite etc.

Recently, GIT-GTL received an interesting faceted stone weighing of 1.38 ct, rectangular cushion shape and pastel pink color for identification. (Figure 1)

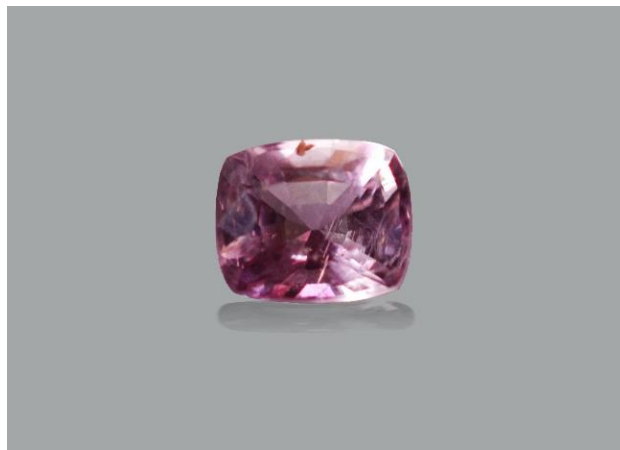


Figure 1: A sample for identification (photo by S. Saengbuangamlam)

Gemological properties

The gemological properties for this stone showed double refractive index from 1.510 - 1.530, SG value of 2.57, inert under UVLW and UVSU. This stone shows distinct dichroism of purple pink and colorless.

Microscopic features

The internal feature showed parallel needle-like inclusions, iron stain filled in fractures and angular crystal inclusions (Figure 2(a-c)).



Figure 2(a): Parallel needle inclusion. Photomicrograph by S.Saengbuangamlam; magnified 50x

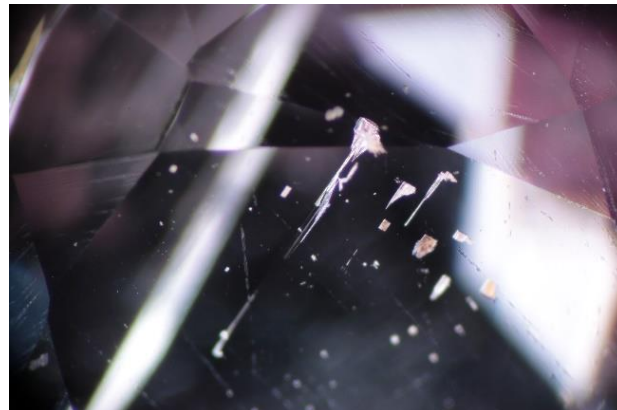


Figure 2(b): Angular crystal inclusion. Photomicrograph by S.Saengbuangamlam; magnified 50x



Figure 2(c): Iron stain in fracture. Photomicrograph by S.Saengbuangamlam; magnified 50x

Advanced spectroscopic analyses

The semi-quantitative chemical analyses by EDXRF reveals Si as the major component with minor amounts of Al, Na, K, Mn, Fe, and Zn (Table 1). The Raman spectrum showing dominant peaks at 490, 552 and 317 Raman shift (cm^{-1}) (Figure 3) and can be matched with GIT's Poudretteite reference spectrum. The UV-Vis-NIR spectrum exhibits a strong broad absorption band at approximately 530 nm (Figure 4) which is responsible for its purple – pink color.

Table 1: The chemical compositions of poudretteite by EDXRF

Element oxide	Concentration (wt%)	Element oxide	Concentration (wt%)
Na ₂ O	5.36	MnO	0.10
Al ₂ O ₃	1.24	Fe ₂ O ₃	0.02
SiO ₂	89.07	ZnO	0.01
K ₂ O	4.18	Ga ₂ O ₃	0.02

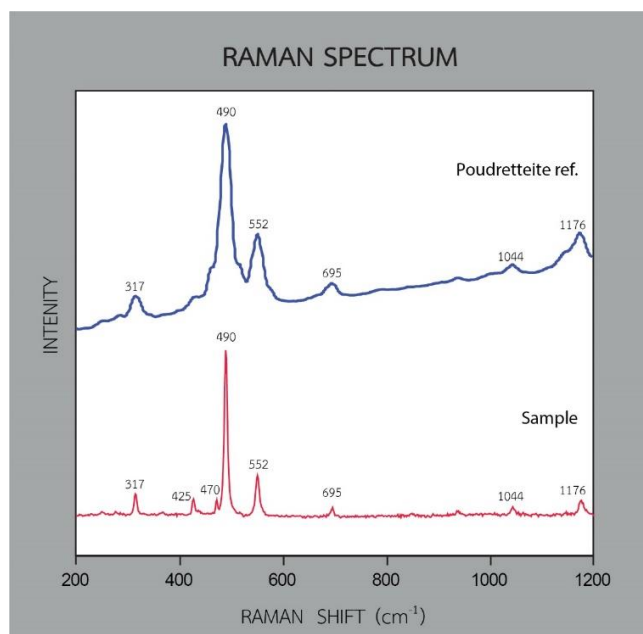


Figure 3: Raman spectra shows various band of 552, 490 and 317 nm

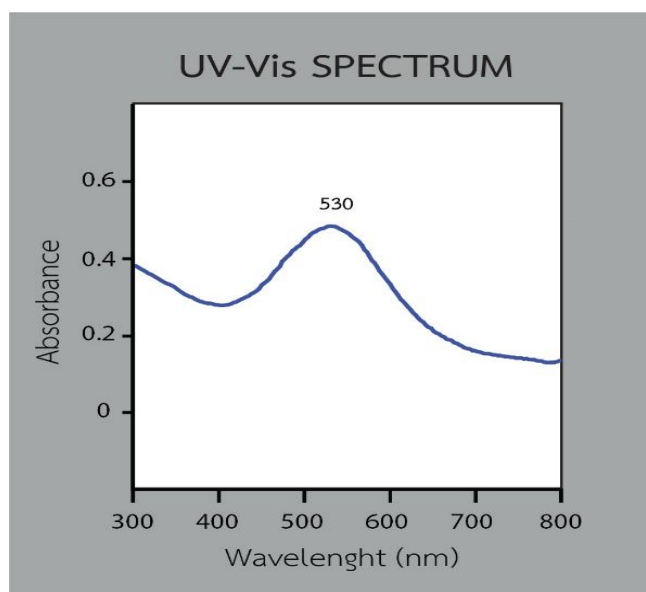


Figure 4: Represent non-polarized UV-Vis spectrum exhibits a strong broad absorption band at approximately 530 nm

Discussion and conclusions

Poudretteite is one of a very rare gemstone. They have been reported found in Mogok gems field in Myanmar (Smith et al., 2003) and Mont Saint-Hilaire in Canada only (March 2018 Retrieved from <https://www.gemdat.org>). This gemstone usually colorless but the purple – pink variety with faceting quality is exceptional.

In order to identify this gem, the refractive index and specific gravity can be easily differentiated from other gemstones with the similar appearance, for instance, pink tourmaline, kunzite, and morganite. Furthermore, the Raman spectra (laser 532 nm) of this sample is perfectly matched to the poudretteite reference and the chemical analysis also confirm the primary interpretation by the basic gemological properties. Based on the UV-Vis spectrum showing broad absorption at around 530 nm, this absorption can be due to manganese as a color-causing element.

The analysed properties on this study including the appearance, inclusion, refractive index, specific gravity, the absorption of UV-Vis-NIR, the Raman spectra and the chemical composition by EDXRF are conformed with those researchers from Canada (Grice et al.,1987) who reported the original data of this mineral. The result is the Natural Poudretteite which is rarely seen in the market.

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References

- Smith, P.C., Bosshart, G., Graeser, S., Hänni, H., Günther, D., Hametner, K., and Gübelin, J.E. 2003. Notes and New Techniques: Poudretteite: A rare gem species from the Mogok valley. *Gems & Gemology*, Vol.39, No.1, p.24-31.