GEM-QUALITY BLACK SPINEL FROM BO PHLOI, THAILAND

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Since the descent of gem corundum production in the Kanchanaburi and Bo Phloi mining fields, western Thailand, local gem cutters have increasingly used black spinel to produce jewellery (SAMINPANYA & SUTHERLAND, 2008). The chemical composition of the Bo Phloi spinel, under due consideration of Mössbauer spectroscopy results, converts to an approximate formula of $^{[IV]}(Mg_{0.72}Fe^{2+}_{0.29}Fe^{3+}_{0.04})^{[VI]}(Al_{1.80}Ti_{0.01}Fe^{3+}_{0.11})O_4$, characterising the material as (Fe-bearing) Mg-Al spinel. Nevertheless, the Raman spectrum is not reminiscent of that of "normal" Mg-Al spinel, but rather similar to spectra of Mg-Fe or Mg-Cr spinel (Fig. 1A). This is assigned to the "inversion" degree of the Bo Phloi spinel (compare LENAZ & LUGHI, 2017). The fairly high iron content controls the strong optical absorption (Fig. 1B). Only at a thickness well below 0.1 mm the sample's greyish brown colour is observed.

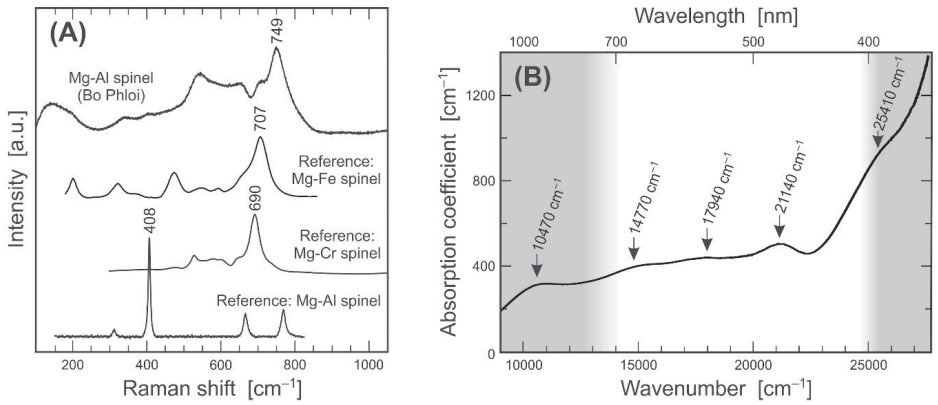

Figure 1. Spectroscopy of the Bo Phloi black spinel. A) Raman spectrum in comparison with three references (Mg-Fe spinel: D'IPPOLITO et al., 2015; Mg-Cr spinel: SHUKLA & RAY, 2017; Mg-Al spinel: NASDALA et al., 2001). B) Optical absorption spectrum, obtained in transmission mode from a 27 μm thick slab.

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