Determination of the Spectrophotometric Properties of Low-Quality Gems in Sri Lanka: A Case Study from Marapana

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Geuda, the most common low-quality gemstones found in Sri Lanka is frequently subjected to different treatments in order to enhance their color and transparency, thereby increasing their trade value. This study was conducted to investigate the applicability of Fourier-transform infrared spectroscopy (FTIR) and Raman spectroscopic techniques to distinguish different Geuda varieties. Low-quality gems were collected from a gem pit in Marapana, Sri Lanka. Based on the morphological and optical properties, the collected gems were identified in three families: corundum, spinal, and garnet. The corundum consisted of twelve gemstones belong to seven major groups including Pita ottu, kalu ottu, Silky, and Young Geuda. The FTIR results of Geuda (i.e., Pita ottu) showed OH stretching infrared absorption peak at 3160 cm^{-1}, thereby suggesting their natural origin and presence of goethite in the inclusion. The Raman vibrations at 242 cm^{-1} and 547 cm^{-1} confirmed the presence of goethite. This study provides evidence for the application of FTIR and Raman spectrophotometry for the identification of functional groups and characterization of low-quality gemstones.

Keywords: *Corundum, FTIR, Geuda, Goethite, Raman spectroscopy*