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A study of gemstones of the I. D. Passa collection, hosted at the Byzantine and Christian Museum of Greece.

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Eight sculptures, of the large gemstone art collection of Ioannis D. Passas hosted at the Byzantine and Christian Museum of Greece, were studied by means of portable Raman spectroscopy and X-Ray Fluorescence to identify the type and, if possible, the origin of the gemstones they are made of. The application of portable Raman spectroscopy and X-Ray fluorescence have been proven to be rapid and successful analytical methods to study gemstones, with main advantage their non- destructive character. The eight sculptures of the I.D. Passa collection examined herein, based on their Raman features and XRF data, were confirmed to be nephrite, fluorite, lapis lazuli, rhodonite and turquoise.

The Raman spectrum of specimen *BXM 23989a* is characterized by peaks at approximately 244, 378 and 685 cm^{-1} assigned to nephrite. In the XRF spectrum, the most intense emission lines were those of Ca and Fe at 3.69 and 6.36 keV, respectively.

The Raman spectra of specimens *BXM 24357-8a* and *BXM 24354 are* characterized by peaks at 731, 1122, 1364, 1778 and 1880 cm^{-1}attributed to fluorite. As for the XRF spectra, F and Ca have strong peaks at 0.60 keV and 3.69 keV, respectively.

The Raman spectra of specimens *BXM 24201a,b* and *BXM 24198* are characterized by strong peaks at 553 and 1319.1 cm^{-1} assigned to Lapis Lazuli, whereas the respective XRF spectra are characterized by strong peaks at 1.74 keV (Si) and 3.69 keV (Ca).

A representative Raman spectrum of specimen *BXM 24289* has given a strong peak at 633 cm^{-1}, attributed to rhodonite. The respective XRF spectrum is characterized by strong peaks at 5.87 keV and 1.74 keV, pointing to the presence of Mn and Si, respectively.

A typical Raman spectrum of specimens *BXM 24142a* and *BXM 24139a* exhibit strong peaks at 231, 417 and 1042 cm^{-1}, characteristic of turquoise. In the XRF spectra, the most intense emission lines are those of Cu and Zn at 8.04 and 8.63 keV respectively.

Regarding the origin of the above-mentioned gemstones, one could assume the following mines, based on their proximity (Griva, 2015).Nephrite from specimen BXM 23989 a might have been originated from a mine in Central China. Lapis Lazuli from specimen BXM 24201 a,b and BXM 24198 might have been originated either from mines in Afghanistan, in the Badakshan Province, or from Myanmar (Mandalay Division).Turquoise from specimen BXM 24142a and BXM 24139a might have been originated either from the Shaxi-Changpushang mine in East China (Anhui Province), or from the Tianhu mine in North China (Xinjiang Autonomous Region).

Griva E., 2015. “Study of semi-precious stones and corals from the I. D. Passa collection, hosted at the Byzantine and Christian museum”, Diploma Thesis, National and Technical University of Athens, School of Mining and Metallurgical Engineering, p. 218.

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