
Mesoamerican Green Stones Artifacts Characterized by In Situ Spectroscopic Methods: A non-invasive approach.

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Abstract

Greenstone artifacts were highly appreciated in Mesoamerica due to their symbolic and religious aspects, as well as their physical properties such as color and hardness. Jadeite was particularly chosen for elite groups and ritual contexts. In our group several archaeological burials has been studied from Olmec, Maya, Teotihuacan, and Aztec cultures. The aim of this research is to determine the use of greenstone minerals from Pre-Classic to Post-Classic periods and the raw materials' sources as a first step in understanding the exchange routes in Mesoamerica. In this work, we present a non-destructive in situ study of lithic objects carried out by means of a several spectroscopic techniques, such as Raman, Fourier Transform Infrared (FTIR), X-ray fluorescence (XRF) and color measurements. FTIR and Raman are suitable for the identification of minerals including jadeite, omphacite, amazonite, albite, muscovite and green quartz, among others. Besides, XRF is appropriate for analysis of the elemental composition of the artifacts. This approach allowed to access unique collections in museums and archaeological contexts, and to obtain essential information for sourcing the raw materials, in particular, jadeite. Some outstanding studies of pre-Hispanic pieces are discussed to show the odds and limitations of this methodology. This work has been carried out at the National Laboratory of Sciences for Research and Conservation of Cultural Heritage at Physics Institute of UNAM (LANCIC-IF) by support of grants of CONACYT LN 270749, CB 239609 and PAPIIT UNAM IN112018.

Keywords: Greenstones, jade, non invasive, spectroscopy, in situ, minerals, provenance, sourcing, raw materials

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