

## **Investigation and Identification of a Number of Precious and Semi-precious Stones Related to Bam Historical Citadel Using Micro Raman Spectroscopy and Scanning Electron Microscopy (SEM/EDX)**

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**Abstract :** The use of gems and ornaments has been common in Iran since the beginning of history. The prosperity of the country, the wealth, and the interest of the people of this land in luxurious and glorious life, combined with beauty, have always attracted the attention of the gems and ornaments of the Iranian people. Iranians are famous in the world for having a long history of collecting and recognizing precious stones. In this case, we can use the unique treasure of national jewelry. Raman spectroscopy method is one of the oscillating spectroscopy methods that is classified in the group of nondestructive study methods, and like other methods, in addition to several advantages, it also has disadvantages and problems. Micro Raman spectroscopy is one of the different types of Raman spectroscopy in which an optical microscope is combined with a Raman device to provide more capabilities and advantages than its original method. In this way, with the help of Raman spectroscopy and a light microscope, while observing more details from different parts of the historical sample, natural or artificial pigments can be identified in a small part of it. The EDX electron microscope also functions as the basis for the interaction of the electron beam with the matter. The beams emitted from this interaction can be used to examine samples. In this article, in addition to introducing the micro Raman spectroscopy method, studies have been conducted on the structure of three samples of existing stones in the historic citadel of Bam. Using this method of study on precious and semi-precious stones, in addition to requiring a short time, can provide us with complete information about the structure and theme of these samples. The results of experiments and gemology of the stones showed that the selected beads are agate and jasper, and they can be placed in the chalcedony group.

**Keywords :** bam citadel, precious and semi-precious stones, Raman spectroscopy, scanning electron microscope

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