

Use of physical-chemical-biological techniques for the analysis of an arrowhead

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The study of metal artifacts has long been the subject of study by many researchers who are trying to reconstruct the habits and customs of vanished civilizations. In particular, the chemical-physical characterization is important in order to acquire information on the origin of the raw materials used for their manufacture, on the production techniques and on the investigation of corrosion phenomena [1,2]. The aim of this study was the chemical-physical-biological characterization of an arrowhead coming from archaeological excavations of the acropolis of Heracleia, stored in the National Archaeological Museum of Siritide in Policoro (Basilicata, Italy).

Through a multi-analytic approach (Optical microscope, Raman, XRF, XPS, biological analysis), the characterization of the arrowhead was carried out and the results obtained gave information about the metals used and the state of corrosion. Raman analysis highlighted the corrosion linked to the presence of Lead Dioxide (Plattnerite) as reported in Figure 2., data confirmed also by the XPS analysis.

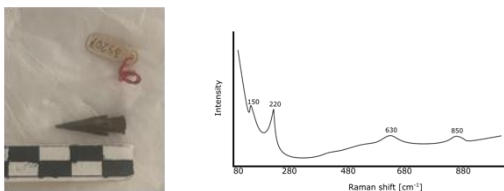


Figure 1. Arrowhead and Raman analysis

Since plattnerite is one of the corrosion products of lead [3,4], the information obtained from the Raman and XPS analysis can also provide indications and soil chemical-physical characteristics (e.g. humidity, pH, chlorine content, and others) of the archaeological environment in which the arrowhead was found. All this demonstrates and confirms how important diagnostics is to retrieve information from a past time.

References

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