

# Oxidized Iron and Copper-Based Excavated Artefacts: Technology, Composition and Digital Database Management

## Extended Abstract

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## ABSTRACT

Analyzing archaeological metals is not an easy task, let alone interpreting the results. This is where the data analysis comes to aid managing and understanding the relationship between the data and therefore the artefacts of our interest.

## CCS CONCEPTS

• **Measurements**; • **Experimentation**; • **Environment-specific retrieval**;

## KEYWORDS

archaeometry, metal analysis, SEM-EDS, TEM/diffractometry, data mining

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## 1 INTRODUCTION

The aim of research project is to create a laboratory protocol in order to analyze archaeological metallic objects/artefacts that are in a severe oxidized state. It will focus on material coming from the ancient harbour of Aegina (“secret harbour”) and the ancient Thouria, that is close to Kalamata, and are dated back to the end of the Roman and the Hellenistic Period respectively. Ordinary and innovative physical and chemical techniques will be used and contribute to the understanding of their condition, the intake of useful information concerning the corrosion mechanism in both soil and water environments, the original alloy’s composition, the production technology and the alloy’s provenance. The TEM/Diffractometry [1] and the digital management of the research’s analytical results (data mining, statistical evaluation, digital database development) are numbered among the entrepreneurial characteristics of this research and are expected to aid the analysis of ancient alloys in the future.

## 2 Techniques & Methodology

The techniques that are going to be used to the archaeological metallic objects, are the Optical Microscopy, the Scanning Electron Microscopy combined with Energy Dispersive X-ray Spectroscopy (SEM-EDS), the X-ray Fluorescence Spectroscopy (XRF), the X-ray diffraction (XRD) and the innovative Transmission Electron Microscopy combined with Diffractometry (TEM/Diffractometry). The results from the analysis will be statistically processed and due to the large quantity of the samples and their variables, they will be imported into digital databases and finally analyzed with data mining software [2], such as Weka and Orange. The parameters that will be used for the data mining are the different kind of elements and crystal phases, that are being found in the samples and that will contribute into finding patterns between the archaeological objects of our interest.

## 3 Conclusion

The fact that this research is going to have a great amount of data from the physical-chemical analysis is making the observation of a pattern between both the samples and the artefacts very difficult. This is the reason why the data analysis can be used as a helpful tool in order to interpret the archaeological databases and give us the chance to get the essential knowledge from them and those that are already available. Therefore, it is evident that the combination of computer and conservation science has beneficial aspects and that the collaboration of these two fields is really promising and it can be beneficial for both scientific fields.

## REFERENCES

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