

# **Corrosion study of archaeological copper artefacts right after excavation and during their storage and stabilization processes**

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This paper describes the use of microbeam analysis techniques for the chemical characterization of corrosion compounds on ancient bronze objects. They include optical microscopy, SEM-EDX, TOF-SIMS, SR-FTIR, SR-XRD, and XANES. The objective is to investigate which combination of analysis methods is most suitable for this type of application, taking into account aspects such as limited sampling and the ability of obtaining spatial information.

In a second part of the presentation the attention is focused on archaeological copper artefacts recovered from wet saline environments. They are often stored in tap water and stabilized in sodium sesquicarbonate solutions. Modification of the natural patina and development of active corrosion can occur during these processes. This implies that monitoring of storage/stabilisation processes is necessary. The focus of the study consists of examining how corrosion potential ( $E_{\text{corr}}$ ) measurements can contribute in providing information on the effectiveness of storage and stabilisation treatments. This paper reports on the  $E_{\text{corr}}$  versus time plots of artificially prepared copper coupons (covered or not with corrosion layers) immersed in tap water and a sodium sesquicarbonate solution. Synchrotron radiation XRD measurements were performed in parallel to understand the reactions that take place during the immersion processes.