

## **IMAGING OF ELEMENTAL DISTRIBUTION IN ARCHAEOLOGICAL OBJECTS WITH 3D MICRO X-RAY FLUORESCENCE SPECTROSCOPY**

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The measurement of elemental distribution in all kind of artifacts from the field of cultural heritage is very important for conservation science and archaeometrical investigations. Due to the uniqueness of the objects the methods used have to be non-destructive. Therefore, X-ray Fluorescence analysis (XRF) has been employed for such kind of investigations since a long time.

The newest methodological development in XRF is its expansion into the depth with a confocal setup for X-rays using X-ray optics. With X-ray optics in the excitation as well as in detection channel a probing volume can be defined with typically a dimension of a few 10  $\mu\text{m}$ . Now the chemical composition of samples can be investigated not only laterally but also into the depth. If the sample is scanned systematically in the lateral dimension as well as into the depth a true 3D Micro X-ray Fluorescence Analysis can be performed in the micrometer regime. Lately, the concept has been transferred to Proton induced X-ray Fluorescence analysis.

An overview of the current status of this method will be given with respect to instrumentation and applications in the field of cultural heritage. Advantages and limitations are discussed and compared to other micro analytical methods. Also the current status of quantification approaches for 3D micro-XRF is given. It is the most important research topic for further developing the method, as only with adequate quantification procedures spectroscopic data are turned into analytical results.