

# The Bernstorf Gold – A Challenge to the Flexibility of SRXRF

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The gold finds from Bernstorf, in the Freising district of Bavaria, were discovered in 1998, in the area of a Bronze Age settlement [1]. First analyses with X-ray fluorescence (XRF) revealed gold of an unusually high purity grade, which was explained by using cementation techniques.

A newer analysis with laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) indicated an even higher purity. These analytical results were the starting point of an ongoing discussion. The amount and type of the detected contaminants were highly controversial and led to contradictory interpretations.

We reanalysed 11 gold samples with synchrotron radiation induced X-ray fluorescence (SRXRF) at the BAMline at BESSY-II. To reach the desired detection limits a thorough analysis with three different excitation energies and detection conditions were applied to confirm or disprove the previous results [2].

In this contribution we will get into the details for the need of the different measurement conditions and the virtues of the use of synchrotron radiation. The use and effectiveness of cementation techniques will be addressed. Finally we will present the achieved results and their impact on the discussion.



Light microscope (Keyence VHX-6000) image of a Bernstein gold sample embedded in resin. Note the irregular surface and the measuring points of the LA-ICP-MS..

[1] R. Gebhard, Bayerische Vorgeschichtsblätter 64,1999, 1–8.

[2] M. Radtke, U., Reinholz, R. Gebhard, Archaeometry, 2016, doi: 10.1111/arc.12294.