

## *Project Summary Report*

Project title: COATING TECHNOLOGY OF *TERRA SIGILLATA* CERAMIC  
PRODUCTION UNRAVELLED BY SR-XRD

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Project objectives: We proposed to examine the red gloss of a number of distinctly different red gloss pottery samples selected as representative of different typologies. The historical importance of the pieces made the adoption of a completely non-destructive technique mandatory. The unique advantage offered by SR-XRD consisted in fact in the capability of obtaining accurate characterisation of the coating layer in a totally non-invasive, non-destructive mode on samples of very variable shapes and dimensions.

Allocated beam-time: BM08 - 08-02-628– 8 shifts

Dates: 11 February 2007 – 15 February 2007

Performed experiments. Synchrotron XRD was used to determine the mineral phases in the gloss. XRD off the surface of the glaze with wavelength of different penetration (1.8-1.0Å) and at low fixed incident angle so that the diffraction signal originated only from the top 20 µm layer of the surface of the potsherd, the typical thickness of these glazes. The X-ray on the beam was apx 100 µm and the diffraction was collected with an image plate. We studied 35 samples.

Main achievements. SR-XRD provided the characterisation of the glosses -allowing the identification of hercynite, magnetite, hematite, quartz, feldspar and calcite- and indicated variations of the relative composition (mainly in hercynite, magnetite and hematite) between different samples. The SR measurements have demonstrated that it is possible to

obtain mineralogical compositions without elaborate sample preparation as well as some degree of depth profiling. The results were considered with regard to the effect of paste preparation, firing temperature and atmosphere, in order to reconstruct the technological cycle adopted by the ancient potters.

Dissemination. The scientific paper including these results will be prepared when also XAS measurements will be performed on the same samples. For the moment, an abstract summarizing all results obtained by the application of SR-XRD at GILDA have been submitted and accepted for the 37<sup>th</sup> International Symposium of Archaeometry (Siena, 12-16 May 2008).