

AM Lab Report 3050  
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Analysis of corrosion products from a Roman mirror from Cirencester  
(Bristol Museum no. B2364-c)

A small fragment of corrosion was submitted for analysis in the hope that this would provide guidance on treatment of the whole object.

First, the fragment was examined by X-ray fluorescence, which revealed the presence of copper (major constituent) plus minor amounts of tin, lead and zinc. The fragment was then crushed for examination by X-ray powder diffraction. The only crystalline phases detected were cuprite ( $\text{Cu}_2\text{O}$ ) (major constituent) plus a small amount of copper metal.

Because the analyses were carried out on the corrosion products rather than the mirror itself, the results have to be interpreted with care. The proportions of elements in the corrosion will not be the same as those in the metal because of differences in their chemical behaviour. Those metals which are more soluble under the particular burial conditions will be depleted with respect to those which are less soluble. In particular, XRF analysis of Roman mirrors usually shows a large amount of tin (which makes the metal white and very brittle) plus a small amount of lead, presumably added to improve workability. (Compare eg J. Bayley, Two Roman mirrors from Hayling Island, AM Lab Report no. 2783)

The failure of XRD to detect any compounds of tin, lead or zinc is not surprising as it is difficult to detect the weak lines of a minor component in the presence of the strong lines of a major component. The copper metal detected was presumably redeposited in the corrosion layer.

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Analytical references: XRD G14 tr 1

XRF MP 1003