



Lead isotopes: information on the Roman metallurgical process for the production of silver

L. Anguilano (1), Th. Rehren (1), W. Müller (2), B. Rothenberg (3)

(1) Institute of Archaeology, University College of London, (2) Royal Holloway, University of London, (3) Institute of Archaeometallurgical Studies, London

The study of the lead isotope to complete the knowledge of a metallurgical process derives on this case forms part of the analyses of Roman silver production at Riotinto (Spain). The site of Riotinto is well known as mining site up to modern times for the production of several metals.

It is common knowledge that the extraction of silver is strictly dependent on the presence of sufficient lead in the system. The main mineral exploited for silver in this area is the iron sulphate jarosite that can be enriched in other cations such as Ag, Pb, Na, K, NH₃. The enrichment of this mineral varies, for instance considering the lead, the concentration of plumbo-jarosite in the vein can go from 3 to 30%. This variation suggested that the presence of lead in the system was not always enough for the extraction of silver.

Archaeological evidence also shows the presence of lead ingots coming from elsewhere and imported to be added to the system. The first interest on the lead isotopes came to discover the origin of the lead metal added to the system. The preliminary analyses of the slags, the local ores and the ingots indicate a mixing line going from the local ores through some of the slag samples to one other source (possibly identified with Cartagena, Spain). But is it possible with the isotope analyses to understand the relative amount of extra lead added to the system? This paper is a tentative to demonstrate this possibility, and in this way also to show a possible different approach for the use of isotopes in the study of ancient metallurgies.