ABSTRACT SUBMISSION

Petrographic Studies of clay cylinders (case study: Central part of Bam country, Southeast of Iran)

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Abstract

Kerman, due to its unique geological and geomorphological conditions, has been regarded as the cradle of metallurgy in Iran. Bam, located in southeastern Kerman, was a major commercial center connecting the Hindu Valley to Mesopotamia and Afghanistan. This region's high commercial significance underscores the need to study ancient metal smelting and extraction centers in this strategic area. In this study, the central part of Bam County was surveyedarchaeologically in 2018 and 2019, resulting in the discovery of numerous clay cylinders, which were more abundant than other cultural materials. Some of these cylinders were sent to the Conservation and Restoration Laboratory of the Archaeological Research Institute of Iran for petrographic analysis. Chemical analysis revealed that the cylinders contained various elements, including zinc (Zn), lead (Pb), iron (Fe), and copper (Cu). The high zinc content in the samples confirmed the successful sublimation process, where zinc vapor was absorbed onto the cylinders' surfaces. Lead and copper may also have vaporized alongside zinc and adhered to the surface. The study of zinc extraction processes in ancient Iran demonstrates a well-designed technique using calamine ore, which decomposes at lower temperatures, enabling zinc extraction without advanced equipment. This method exemplifies the advanced metallurgical knowledge in ancient

Keywords

Southeast of Iran, central part of Bam country , Clay cylinders, Petrography

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