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## Finding of artisanal uses of elemental mercury in the city of Murcia in medieval times

José María Esbrí<sup>1</sup>, Luis Mansilla-Plaza<sup>1</sup>, María Jesús Sanchez-Gonzalez<sup>2</sup>, and Pablo Higuera<sup>1</sup>

<sup>1</sup>Instituto de Geología Aplicada (UCLM), Pl. Manuel Meca, 1, Almadén (Ciudad Real), 13400, Spain (josemaria.esbri@uclm.es)

<sup>2</sup>Archaeologist, Calle el Balcón 5, urbanización Altoreal, Molina de Segura (Murcia), 30500, Spain

Mercury (Hg) was used in gilding techniques since ancient times. This metal gilding technique consisted of applying an amalgam of Au and Hg to the surface of a metallic object and then removing the Hg to achieve adhesion of the Au to the support. The traditional preparation of amalgam was a mixture of Au with Hg (in a ratio of 1/8). After this preparation, the mixture usually was ground in a mortar, heated, and then cooled by pouring it into water. The paste was applied to the areas to be browned and then the piece was subjected to mild temperatures so that the Hg evaporated, leaving a thin layer of Au on the surface of the object.

The origin of this work is the discovery of an evident quantity of liquid Hg on a site under construction, near the old wall of the city of Murcia, at a level identified as from medieval times. To elucidate the origin of this Hg, a sampling of medieval materials has been carried out throughout the site, including both the area with liquid Hg, the entire area what appears to be the work room and the adjacent rooms. The sampling has been carried out using an Ejkelp sampler at various depths. These soil samples were analysed by Energy Dispersion X-Ray Fluorescence using a PanAnalytical device. Total Hg and Hg speciation data were obtained by Atomic Absorption Spectrometry using a Lumex equipment. In addition to this, a gaseous mercury monitoring has been carried out using a portable atomic absorption equipment to search Hg sources and gaseous Hg dispersion in the atmosphere of the studied site. Results of the survey has shown an evident and intense soil Hg pollution in a small area of 2x2 m. This affected area was located near the outer wall of the medieval building and was very restricted, which suggests that it was a storage place for liquid Hg for later use in other areas. The degassing of these recently uncovered materials produced a significant dispersion of the Hg gas throughout the enclosure. In addition to this, samples of medieval materials have shown very high concentrations of Hg in the vicinity of the contaminated area, and high concentrations in the rest of the enclosure. Speciation analysis have shown that the Hg in this part of the enclosure is in the form of metacinnabar and Hg bound to humic acids, which suggests the presence of an atmosphere with extremely high concentration of gaseous Hg in medieval times that was later deposited in the soil, being fixed to its organic phase. Multielemental analysis has shown additional high concentrations of Pb, Cu and Sn, suggesting that the artisanal works in the enclosure involved these elements too. While waiting for more specific archaeology works that can corroborate it, the origin of this Hg in the area could be the storage for the realization of gilding work on metals with this element.

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