

LUSTRE AND LUSTRE TECHNOLOGY IN SPAIN - COMPARISON BETWEEN ANCIENT PRODUCTIONS FROM PATERNA (OLLERIES XIQUES 13 TO 15TH CENTURIES) WITH MODERN ARTESIAN PRODUCTIONS

Josep Roqué¹ -- Judit Molera² -- Màrius Vendrell-Saz³ -- Josefina Pérez-Arantegui⁴

¹*Diamond Light Source, Diamond House. OX11 0DE Chilton, Didcot, UK.*

²*Departament de Física, Universitat de Girona. 17071 Girona, Spain.*

³*Departament de Cristal·lografia, Mineralogia i Dipòsits Minerals, Universitat de Barcelona, 08028 Barcelona, Spain.*

⁴*Departamento de Química Analítica, Universidad de Zaragoza. 50009 Zaragoza, Spain.*

Lustre is a medieval ceramic decoration that corresponds to a nanostructured thin layer formed by metallic copper and silver nanocrystals embedded in a glass matrix which required deep knowledge from the artisans on the raw materials used and on the kiln conditions. Their empirical knowledge led to the achievement of colourful lustre decorations ranging from reddish to yellowish or even greenish, some of them with a metallic shine with a purplish iridescence associated. Lustre ceramics dating from 13th century from *Olleries Xiques* workshop in Paterna (Spain) have been studied linking their chemical composition and nanostructure with their colours and shine and compared to modern lustre productions in a modern workshop Valencia region. In ancient lustre two kinds of nanostructures are found, yellowish lustre decoration constituted by silver metal-glass nanocomposite, and reddish lustre decoration constituted metallic copper nanocrystals and by copper oxides nanocrystals and in some cases metallic copper nanocrystals covered with an oxidized shell of CuO and partly Cu₂O have been found. In modern lustre productions only metallic copper nanocrystals are found developing a fully metallic appearance at the end of the production process. Although the aesthetic differences, related to colour and shine, appeared between the ancient and modern productions, this detailed study demonstrates that the production technology in both productions is the same, and shows that differences seem to be linked in first place to the raw materials used (silver or copper), and in second place to the annealing conditions (reducing atmosphere, time and temperature) during the production process.