



### Abstract Form

**TITLE:**

Chemical and Morphological Characterization of the Pictorial Layer in 17<sup>th</sup> Century Portuguese Azulejos

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**SESSION TOPIC** (please mark):

Transformation on heritages surfaces

Chemical changes in the heritage environment

Development and evaluation of cleaning and conservation materials and methods

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Chemical mapping/imaging of heritage investigation

Information technologies/database and information networks for cultural heritage science

Concepts and methods in chemistry education and training for conservation professionals

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## **Chemical and Morphological Characterization of the Pictorial Layer in 17<sup>th</sup> Century Portuguese *Azulejos***

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Historic ceramic tiles (*azulejos*) are a valuable cultural asset in Portugal, being linked with its architecture for several centuries. In the 17th century, Portuguese *azulejos* were manufactured by the majolica process whereby an opaque white glaze was decorated with several pigments and then fired over a terracotta biscuit. Although most pictorial materials are inserted in the glaze, we often observe in the Portuguese *azulejos* a pictorial layer above the glaze. This is not because it was actually painted over it but simply because the paint never penetrated the glaze, not even upon firing. The morphology and chemical composition of such "unglazed" colours was investigated in a set of *azulejos* from the 17th century using Raman spectroscopy, micro energy-dispersive X-ray fluorescence ( $\mu$ -EDXRF) and scanning electron microscopy with energy-dispersive X-ray fluorescence (SEM-EDXRF). Our work focused mainly on the yellow, orange and quasi-black decorations whose exact chemical composition was doubtful. Preliminary results show that the yellow colour is composed by a lead-tin-antimony compound, the designated triple oxide; the green colour is a mixture of the triple oxide and an unidentified cobalt compound; and the orange colour is a mixture of the triple oxide and iron oxide.