

Saadian Mosaic (Zellige) from historical monuments of Marrakech, Morocco: Degradation state and production technology

M. EL HAUM¹, L DAUDI¹, M. EL OUAHABI¹, N. FAGEL²

¹Laboratoire de Géosciences et Environnement (LGSE), Département de Géologie, Faculté des Sciences et Techniques, Université Cadi Ayyad, Marrakech, Morocco

²UR Argile, Géochimie et Environnement sédimentaires (AGEs), Département de Géologie, Université de Liège, Belgium

Abstract

This study is focused on Saadian ceramics called zellige from the archaeological sites of "El Badi palace" and "Saadian Tombs" (Marrakech, Morocco) dated in late 16th Century and classified as world heritage by UNESCO in 2008. A multi-analytical approach based on optical microscopy, cathodoluminescence, scanning electron microscopy, X-ray fluorescence and X-ray diffraction investigations and re-firing tests on ceramic supports has been used, in order to determine raw materials source, technical manufacturing and firing temperatures used by the Saadian artisans.

Production technology, microstructure and the chemical composition suggest that the zellige pieces used in the construction of Saadian monuments in Marrakech are either imported from Fez, i.e. the main center of production of the zellige in Morocco, or manufactured locally in Marrakech according to the current standards and procedures in Fez.

The calcareous clay raw material was used to manufacture these ceramics, but firing temperature was different. Zellige of El Badi palace was fired at a maximum temperature of 700°C in oxidizing atmosphere, while the one of Saadian Tombs was fired in the range 900-950 °C. The low firing temperature for Zellige facilitates the pieces cutting but it is responsible for the poor quality of these materials due to the absence of the vitreous phases. The results provide a scientific support for decision making in future conservation and restoration strategies of historical monuments across Morocco.

Key words: archaeological ceramics; Production technology; Degradation state; El Badi Palace; Saadian tombs; Morocco.