

For the first time, archaeometric studies are carried out on Timurid material in order to compare with the written sources from the material science point of view.

The Ak Saray - literally the White Palace - was built between 1399 and 1405 in Shakhrisabz, Tamerlane's hometown. The tiles coming from this oversized monument have been analyzed by SEM-EDS, proton RBS (Rutherford Backscattering Spectroscopy), white light interferometry and XRD (conventional and synchrotron radiation diffraction including pole figure determination).

The results obtained on 22 sherds enable us to determine the main steps of the making process with a variation for the calligraphic patterns; the thickness of the gold decorations is mainly submicronic. It implies that not only ceramists but also calligraphists and gold beaters took part in the elaboration of so accomplished composite objects.

1. Kehren, L. 1978. Tamerlan, Payot, éd. de la Baconnière, Paris.
2. Golombek, L. 1992. Discourses of an imagery arts council in fifteenth-century Iran. *Timurid Art and Culture: Iran and Central Asia in the fifteenth century*, p. 1-17.

30. Non-destructive and micro-invasive techniques for cultural heritage diagnostics: A case-study of glazed tiles from Portuguese historical buildings

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Scientific analysis / investigation of cultural heritage objects is ideally conducted in a manner that enables fail-safe transfer to late generations. In this work a research methodology including the application of non-invasive (neutron tomography -NT, synchrotron radiation -SR) and micro-invasive techniques (neutron activation analysis- INAA, X-ray fluorescence -XRF and X-ray diffraction -XRD) for diagnostic of different cultural materials is presented.

Among cultural assets, ceramics and particularly glazed tiles ("azulejos" in Portuguese and Spanish, from the Arab designation "al-zuléija" or "al-zulaiju") deserve particular attention in the Mediterranean region, where they have long been used to decorate buildings. "Azulejos" are present in many historical Portuguese buildings of the XVII to the XIX centuries. In fact, one may say that "azulejos" are everywhere in Portugal. They decorate everything from walls of churches and monasteries, to palaces and ordinary houses. Most of these "azulejos" present various degradation features, mainly due to exterior exposure in a range of different environments.

Chemical and mineralogical characterization of "azulejos" from different architectural sites in Portugal is performed to obtain a compositional database of their different constituent materials. Trace and major element contents are obtained by INAA and XRF; SR is applied for elemental speciation. The identification and semi-quantification of mineral phases is obtained by XRD. These methods will complement further establishment of NT patterns of the several types of materials constituting cultural assets. Characterization and diagnosis of original material and degradation features is presented for selected ceramic samples, with a focus on "azulejos".

31. From the raw material to the finished object: How museum artefacts can help to reconstruct manufacturing processes of 19th century Persian pottery

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Recorded information on the manufacture of Persian pottery by indigenous craftsmen is very rare. Fortuitously however, in 1887 Robert Murdoch Smith, director of the Edinburgh Museum of Science and Art, commissioned the Tehran master potter Ali Muhammad Isfahani to write a treatise

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