

Gilding technology on haft rang tiles from three Timurid monuments (15th century A.D) in eastern Iran: an assessment for re-production

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The haft rang tiles have been studied both technically [1] and aesthetically [2]. Although gilding decorations on Timurid haft rang tiles, which have been reported to be found out of today's Iran frontiers, have already been scientifically investigated [3], this is the first study on these decorated tiles from Iran. The gilded tiles of Ghiyathiya Madrsa, Firuzshahi Mosque and Abubakr Taybadi tomb, three Timurid buildings in east of Iran, were subject of study.

Light Microscope and scanning electron microscopy (SEM) observations showed that cut gold leafs was directly fired on a white pre-fired substrate glaze (Fig. 1b,c). In addition, a red ochre opacified glazed line (rich in iron oxide) surrounded the gilded areas (Fig. 1d). Although the presence of gold layer over the red ochre opacified glaze, in some parts, demonstrated that the gold leaf was applied after drawing and firing the red lines, there was no evidence to show these lines had been fired either in the same time with other overglaze decorations or later. The use of an unfired buffer layer, rich in iron oxide, has been reported from Ilkhanid (the thirteen century AD) gilded tiles in which the gold strata have been applied over the ochre layer by an organic binder [4,5].

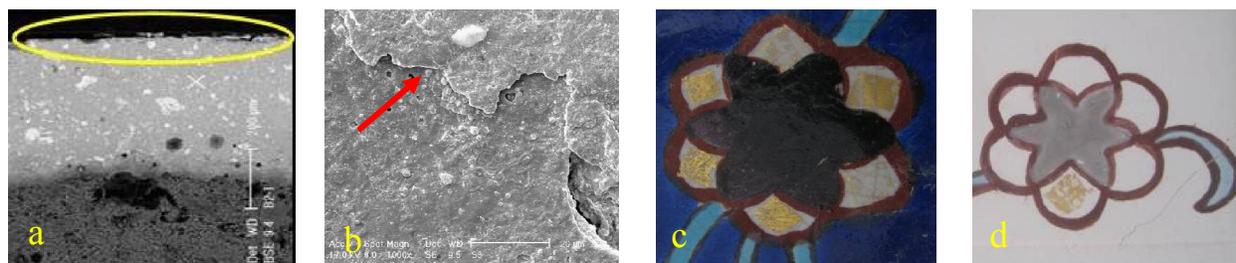


Fig.1. (a) SEM micrograph of cross-section (b) and surface of gold layer on the white glaze, (c) the photo of gilding decoration on a haft rang tile from Firuzshahi Mosque and (d) the photo of re-produced gilded tile

In order to shed light on the technique of the Timurid gilded tiles, an attempt was made to re-produce a gilded surface in the laboratory based on the technological observations and the ancient recipe [6]. To do so, the red ochre glaze was first re-produced based on the semi-quantitative energy dispersive X-ray spectrometry (EDS) analysis on the Timurid ochre glazes. Afterwards, the modern glazed ceramic were painted with the red ochre and the glazed tile was re-fired. Gold leaf were subsequently adhered temporary on the white glaze by an Arabic gum. Then, the pieces were fired in various temperatures (500, 600 and 700 °C) for 20 minutes. The sample that was heated at 500 ° had a similar appearance to the studied Timurid gilded tiles (Fig. 1e).

The investigations on gilded tiles from mentioned monuments demonstrate that these tiles have been gilded by gold leaf that has stuck on the white glaze, as has reported by Pacheco at Aq Sarai (a Timurid palace) in Samarqand. Moreover, the re-production of gilding the tiles in laboratory showed the ability of applying a gold layer on the glaze by re-heating the tile.

References

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