

TILE PATHOLOGIES: GREEN STAINS IN BLUE-AND-WHITE GLAZES FROM AN 18TH CENTURY TILE PANEL FIGURING LISBON

T. P. SILVA¹, M. O. FIGUEIREDO¹ and M. I. PRUDÊNCIO²

¹ LNEG, Unit of Mineral Resources and Geophysics, Estrada da Portela, Apartado 7586, 2721-866 Alfragide, Portugal *teresa.pena@lneg.pt

² Instituto Tecnológico e Nuclear (ITN), Estrada Nacional 10, 2686-953 Sacavém, Portugal

Introduction

Glazed ceramic tiles (named "azulejos" in Portuguese, from the original Arab designation "al-zulayj") deserve particular attention due to a wide application in the cultural heritage of the Mediterranean area. Ancient tile panels exposed to different environmental conditions are liable to the development of micro-organisms that play a major role in tile pathologies and degradation, being particularly hazardous in decorated glazes. This is the case of a large 18th century panel of blue-and-white tiles exposed at the National Tile Museum (MNAz) figuring Lisbon before the destruction caused by the 1755 earthquake [1]. Green and pink stains are nowadays perceptible in the glaze of many tiles from this valuable panel. The present work reports a diagnosis of the green tarnishing of white and blue areas as a preliminary step towards future conservation actions using neutron beams and gamma radiation*.

Experimental

A small fragment showing green stains was collected from a non-exposed tile of the Lisbon panel stored in the MNAz depository (fig. 1a). Observation under a stereomicroscope clearly showed that the stains were located at the surface of the glaze (fig.1b) without attaining the underlying ceramic body (fig. 1c).

The tile fragment was subsequently analysed applying non-destructive techniques: direct irradiation of the glaze in a Bragg-Brentano X-ray diffractometer (XRD) to detect the eventual development of new phases in green areas due to glaze degradation, plus irradiation in a wavelength-dispersive X-ray fluorescence spectrometer (XRF-WDS) for the chemical characterization of the glaze.

Results

XRD patterns are identical for white and blue areas irrespective the presence of green stains. As expected from an 18th century tile glaze, cassiterite and quartz are the crystalline phases observed. Similarly, no chemical changes were detected by XRF-WDS, particularly in what concerns the chromophores (copper and cobalt) and main glaze components (tin and lead).

Conclusions

The constitution of the blue-and-white glaze is not affected by the green stains that have a surface character, suggesting the presence of algae colonies. It is foreseen to apply electron microscopy and other destructive techniques for micro-organisms characterization.

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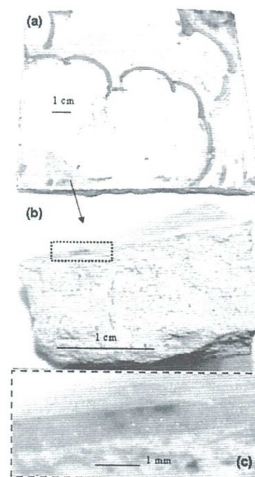
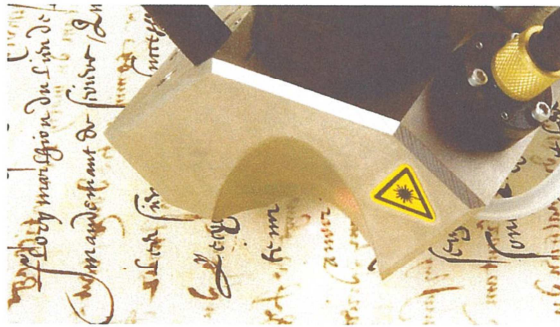


Figure 1: (a) Studied blue-and-white tile from the original 18th century panel; (b) fragment presenting green stains; (c) detail showing that the stains are confined to the glaze surface.

References

1. J.M. Simões, Iconography of Lisbon in Azulejos (in Portuguese), Olisipo **95** (1961), 115-134.

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