The effect of the addition of transition metal ions on potash-glass corrosion

In this work the corrosion processes of potash-glass surfaces in contact with aqueous solutions were studied. Model glass samples were prepared reproducing the compositions of the medieval stained glass from the Mosteiro de Santa Maria da Vitória. Cu, Mn and Fe oxides were added, either individually, or in combined form. Corrosion and its progress were studied using ion beam analysis, FTIR spectroscopy, optical microscopy and the changes occurring in the aqueous solution, in particular its pH value.

This study shows that the experimental conditions used reproduce well the corrosion found in ancient glasses of potash composition, weathered through five centuries. It also indicates that pH is a good parameter for following corrosion kinetics in high humidity conditions.

In collaboration with Instituto Tecnológico e Nuclear.

Publications
Provenance studies of Portuguese glasses

The main aim of this project is to study the provenance of Portuguese glasses from the 15th to the 20th century and evaluate the currently available analytical techniques for the study of glass materials, such as micro-EDXRF, EPMA, ICP-MS, AAS and NAA. New techniques are being developed as well as a new micro sampling process. The investigation focused on the glasses from Coimbra and Marinha Grande royal glass manufacturers between the 18th and 19th century. Chemical characterization of 17th century millefiori and filigrana glasses excavated in the Mosteiro de Sta. Clara-a-Velha in Coimbra was also performed providing interesting information related with the provenance of these glasses. Different types of production were identified, such as Venetian millefiori, façon de Venise filigrana and other utilitarian objects probably locally made.

In collaboration with the Instituto Tecnológico e Nuclear, the Instituto de Tecnologia de Tomar, the Mosteiro de Santa Clara-a-Velha, the Research Unit Vidro e Cerâmica para as Artes, and the AGLAE Laboratory (EU-ARTECH Program).

Selected communications

Stained glass from the Monastery of Batalha: non-destructive characterization of glass and paintings

The characterization of stained glass fragments belonging to the Mosteiro de Santa Maria de Vitória in Batalha, was performed by non-destructive analyses. The objective of the work was to determine the composition of the glass and respective paintings trying to establish the corresponding production periods. The analyzed glasses may be classified into two groups, according to their composition: potash glasses are the original ones, produced during the 15th and 16th centuries and the soda-lime glasses were introduced during the conservation-restoration works performed in the 20th century.

In collaboration with the Instituto Tecnológico e Nuclear and Instituto de Gestão do Património Arqueológico e Arqueológico.

Communications