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Nanotechnology from the past - historical reproductions of yellow silver stains

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Yellow silver stain appeared between the late 13th and early 14th centuries and was first described by Antonio da Pisa. It is described as consists of a mixture of silver salts with ochres which forms, after firing, a colored layer obtained by the formation of silver colloidal particles inside the glass substrate. The obtained color depends on several properties and reactions, related to the glass substrate and paint composition and also with the time and temperature of the annealing.

This study was centered on the analysis and reproduction of recipes found in historical treatises to better understand production processes of the yellow stain. The analysis of treatises resulted in the collection recipes from the 14th to the 19th century, belonging to Antonio da Pisa, André Félibien, Johannes Kunckel, George Bontemps, Bologna Manuscript, and Marciana Manuscript.

Ten recipes were selected and their viability to produce satisfactory results was tested. The characterization of the reproduced recipes was done via UV-Vis Absorption and Reflectance Spectroscopy, Particle Induced X-ray Emission and X-ray Diffraction. These analyses allow us to comprehend the difference in tones obtained, relating those with the paint compositions. Finally, the obtained results were compared with yellow silver stain on historic samples.

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