

PROTECTIVE LAYERS ON IRON SAMPLES AND COMPARISON TO HISTORICAL IRON ARTEFACT

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Wrought iron is susceptible to corrosion deterioration in atmosphere. Corrosion resistance of iron can be enhanced by various methods among them by surface treatment to form protective layers using corrosion inhibitors. One of traditional protective layers on historical artefacts is tannate coating, which is widely used by conservators. The new commercial surface treatment (Zinc Silicate) employed in this project can be applied in atmosphere with a wide range of the corrosivity. The specimens with tannate and the zinc-silicate surface treatment were exposed at different time span at outdoor/indoor atmosphere. The samples were compared to the historical iron artefact with surface treatment (bluing) exposed in atmosphere with corrosivity C2 (low pollution) for 300 years.

The main goal of the project was to characterise protective layers over studied time span and determine corrosion resistance of the studied samples. Analytical techniques used in the work were μ -Raman spectroscopy, electrochemical impedance spectroscopy (EIS) and energy-dispersive X-ray spectroscopy (EDX). Spectrocolorimetry was used to compare change of the surface colour over time. It was found that corrosion products formed on samples demonstrate development of corrosion products over time. Characterization of the surface on the iron artefact contributes to complete the study of corrosion products. Changes on the surfaces correspond to exposure in atmosphere with low corrosivity.

Commercial surface treatment provides comparable protection against corrosion.

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