Evaluation of Salt Removal from Azulejo Tiles and Mortars using Electrodesalination

Azulejo tiles are part of the Portuguese cultural heritage and are worldwide appreciated. The durability of this building material is affected by the accumulation of salts, causing fractures and peeling of the glazing and ultimately leading to the degradation of the tile panels and the irremediable loss of historic value. In this work preliminary studies with single tiles presenting an underlying layer of mortar have been conducted to assess the amount of salts that can be removed from the building material using a new technique called “electrodesalination”, in which the salt’s ions are transported out from the tiles by applying an electric current on the backside. Results shown here include an assessment of how much of the salts did come out in comparison to what was originally there, and additionally if the electrodesalination succeeded in removing salts down to a point where the tile and underlying mortar are no longer at risk of salt induced decay. The main conclusions are that the technique is successful in extracting salts from mortars (removals efficiencies between 88% and 92%) but not as good for the tile (removals between 10% and 80%). The risk of salt damage to the mortar and tile was either considerably reduced or disappeared, except for one situation with nitrates, thus showing that even though some optimisation is needed, electrodesalination stands as a promising in-situ technique to improve durability of the historic valuable Portuguese Azulejo tile.