Electrokinetic desalination of glazed ceramic tiles

Electrokinetic desalination is a method where an applied electric DC field is the driving force for removal of salts from porous building materials. In the present paper, the method is tested in laboratory scale for desalination of single ceramic tiles. In a model system, where a tile was contaminated with NaCl during submersion and subsequently desalinated by the method, the desalination was completed in that the high and problematic initial Cl(-) concentration was reduced to an unproblematic concentration. Further conductivity measurements showed a very low conductivity in the tile after treatment, indicating that supply of ions from the poultice at the electrodes into the tile was limited. Electroosmotic transport of water was seen when low ionic content was reached. Experiments were also conducted with XVIII-century tiles, which had been removed from Palacio Centeno (Lisbon) during renovation due to damage of the glazing from the presence of salts. These tiles were severely contaminated with both chlorides and nitrates, and one of the tiles also contained sulphates though at a low concentration. The charge transfer was too low in the experiments to obtain full desalination, but promising results were obtained as significant decreases (> 81% Cl(-), similar to 59% NO(3) (-) and similar to 22% SO(4) (2-)) were seen.

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