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Soluble salts are considered as one of the most common causes for decay of building materials. In the present work, an electrokinetic method for desalination of sandstones from a historic warehouse was tested. The sandstones claddings were removed from the warehouse during a renovation action as the outer surface was scaling due to salts. The focus of the work was on the effect of electrokinetic desalination for removal of unevenly distributed mixtures of salts. Previous reported studies were conducted with laboratory contaminated stones with single salts, which were relatively evenly distributed in the stones, i.e. the present investigation faces more challenges relevant to a real desalination action. Experiments were conducted with two Obernkirchen sandstones from the same warehouse, but with different levels of salt concentrations and porosity. The investigation includes removal of the most common salts: chlorides, nitrates, sulphates. In the experimental setup the electrodes were placed in a clay poultice: a mixture of kaolinite, calcite and distilled water. An electric direct current (DC) field was applied to the sandstone. By applying 2mA for 5–11 days it was possible to reduce the chloride concentration from up to 420mg/kg to concentration of 140mg/kg, nitrate concentration from 1000mg/kg to concentration of 310mg/kg nearest the cathode and the sulphate concentration from up to 540mg/kg to 30mg/kg nearest the anode in 750–1020g dry matter stone sample. The final concentrations meet the limiting values indicating no risk for salt decay. The placement of the anode related to the original outer surface of the stone showed its importance only in the experiments with the long duration 10–11 days. Due to the placement of the anode to the outer surface of the stone segments which was more contaminated, higher concentrations of nitrates and sulphates were measured in the anode clay poultices at the end of experiments. The longer duration might show even more significant role of the electrode placements. The clay poultice successfully neutralized the acid from electrolysis at the anode. During the treatment the water content was very low in the stones, between 1.3% and 2.1%. Electroosmotic water transport was observed in the clay poultices, however, there was no decrease of the water contents in the stones at the end of the experiments, so there was no indication of an electroosmotic effect in the stones themselves under the present conditions.

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