Influence of Surfactants on Electrochemical Chloride Extraction in Reinforced Cement Mortar

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This paper aims to examine the effect of surfactants on the electrochemical chloride extraction for remediating the chloride contaminated reinforced cement mortar. Triethanolamine dodecyl sulfate (TADS) and sodium dodecyl benzene sulfonate (SDBS) were chosen to represent as cationic surfactant and anionic surfactant, respectively. Different applied potentials of 20V, 40 V and 60V were applied. The extracted chlorides in electrolytes, residual chlorides in mortar, energy consumption, corrosion potential and corrosion current density (decided by half-cell potential and potentiodynamic polarization) of embedded steel were measured. The results indicate that the surfactants increase obviously the efficiency of electrochemical chloride extraction. Compared to SDBS, TADS has a better effect of chloride removal. Besides, the surfactants reduce the energy consumption. Furthermore, the decreases of the I_{corr} values and increases of the E_{corr} values for the embedded steels due to the additions of surfactants are obtained after the electrochemical treatments. Accordingly, the surfactants can be applied to improve the remediation effect of electrochemical chloride extraction on the chloride-contaminated concrete structures in real environment.

Keywords: Electrochemical chloride extraction; chloride extraction efficiency; surfactants; corrosion potential; corrosion current density.

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