Abstract

Efflorescence represents a common deterioration phenomenon in earthen heritage, leading to aesthetic damage, material weakening, and long-term conservation issues. This study evaluates the effectiveness of salt crystallization inhibitors and silane treatments on lime-pozzolan mortars. Specimens were tested for capillary absorption and contact angles to assess their overall behavior under saline exposure. Untreated reference samples experienced severe cohesion loss and structural degradation. In contrast, silane treatments established total hydrophobicity, completely blocking the entry of the saline solution. Furthermore, the application of crystallization inhibitors allowed capillary transport but successfully prevented internal tension and subsequent damage. Finally, practical applications of these promising non-destructive findings are being investigated at the Colosseum's Commodus passage to address nitrate and sulfate degradation. Raman spectroscopy was effectively utilized to monitor soluble salt crystallization dynamics before and after the treatments.