

SALT DAMAGE: NEW INSIGHTS FROM TIME-LAPSE EXPERIMENTS

Eric Doehne and Carlos Rodriguez-Navarro
The Getty Conservation Institute

Abstract

Salt damage is a serious problem affecting many monuments in the Mediterranean Basin. A series of salt damage experiments have been documented using time-lapse methods coupled with video microscopy and the environmental scanning electron microscope. Time-lapse methods are needed in order to better understand the dynamic aspects and kinetics of the salt damage process. Also, time-lapse experiments in a humidity and temperature controlled environment allow the separation of the important factors that control salt damage. For this work we assume that salt damage is primarily caused by the evaporation of water, followed by the eventual supersaturation of the remaining solution and the rapid precipitation of salt crystals in stone pores. Little damage appears to be caused by efflorescence or even subfluorescence under certain conditions (non-supersaturating, slow crystallization). Preliminary results show that the evaporation rate (and therefore the degree of supersaturation) and salt type are important factors in salt damage. The salt type plays a critical role, since some salts were observed to precipitate at the air/ water interface (less damaging) and others within the solution, which caused more damage.