Influence of pH during chemical weathering of bricks: Long term exposure - DTU Orbit (18/01/2019)

Influence of pH during chemical weathering of bricks: Long term exposure

Within the framework of environmental weathering of bricks in historical structures, this study focuses on new bricks currently employed for restoration projects. The bricks were subjected to an accelerated chemical weathering test by immersion in solutions with pH ranging from 3 to 13 for different lengths of time up to 432 days, data to 288 days are presented since the project is still ongoing. The study analyzed the changes of pH induced in the solutions by the presence of the bricks (this also served to adjust the pH to the intended value), as well as the concentration of various ions extracted from the bricks over time. As the bricks were taken out at the different times, their capillary absorption curves were determined, followed by a vacuum saturation with water for the determination of the open porosity, as well as the density. Finally, a 24 hour total immersion in water was also carried out proving to be practically the same as achieved after the capillary absorption rate stabilized after 6 hours in this test. The results obtained showed that the two main deterioration mechanisms are the ion-exchange at acid pH, and the alkaline corrosion undergone particularly at pH 13.

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