

Characterization of sorption cycles of calcium-silicate-hydrates

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Objectives:

This research is conducted to investigate the binding matrix in cementitious materials, calcium-silicate-hydrates (C-S-H) using sorption techniques

Why Study Sorption?

The main goal of sorption based investigations is to facilitate better durability assessments. This is possible due to improved assimilation of microstructural and dimensional changes upon subjecting samples to desorption-sorption cycles.

Tools to Assess Sorption

Dynamic and static methods are employed to acquire sorption behavior at shorter and longer time frames, respectively. The samples are subjected to varying relative humidity at a constant temperature in a step-wise manner to obtain an isotherm.

Characterizing Sorption Cycles

Insights into pore structure especially pore size distributions and specific surface area can be obtained by characterization sorption cycles. In conjunction with various empirical, semi-empirical, and thermodynamic models, parameters including interaction strength of sorbent and adsorption energy can be estimated.

Why study sorption behavior of C-S-H?

Moisture sorption-induced deformations in cementitious materials, attributed to the changes in moisture content, are potential causes for degradation and failure. The majority of moisture movement is governed by the C-S-H phase, which is the binding matrix in cement-based materials. The work has demonstrated the importance of cavitation as a mechanism for understanding the desorption isotherm.

