

SMART CEMENTITIOUS MATERIAL SYSTEMS AND STRUCTURES

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ABSTRACT

The objective of this minisymposium is to bring together researchers working in the field of smart cement-based composites and structures. This field requires advanced multidisciplinary investigations and presents numerous new challenges.

This minisymposium is intended as a forum for presentation and discussion of the results and problems related to mathematical modelling and numerical simulation in close cooperation with specifically designed experimental testing of cement-based, tailor-made material systems and structures, including engineered cementitious composites. Innovative cementitious composites with smart constituent phases are of particular interest. For example shape memory materials (alloys, polymers) are mentioned, which provide special functionalities for material layouts and structures such as the ability of self-healing or self-centering, or high damping capacity.

Different scales of observation (e.g. electron and optical microscopy, digital image correlation) and description via multiscale methods of averaging and computational homogenization can

be considered, including micro-, meso- and macroscopic scales. The main goal is to find constitutive relations, taking into account the influence of the interfaces between the different constituent phases, and finally to assess the effective properties of the material system and structures demonstrated in complex deformation processes.

Presentation of both deterministic and stochastic models and solution techniques for multiscale and multiphysics processes, as well as extended structural design methodologies and methods of material design and optimization, related to sensing and actuation in smart cement-based materials and structures are welcome within the scope of this minisymposium.