
Multiscale and multiphysics approaches for durability of construction materials and structures

Ariane Abou Chakra*^{†1} and Laurie Lacarrière*^{‡1}

¹Laboratoire Matériaux et Durabilité des constructions [Toulouse] (LMDC) – Institut National des Sciences Appliquées - Toulouse, Université Toulouse III - Paul Sabatier – INSA-UPS 135 Avenue de Rangueil - 31077 TOULOUSE CEDEX, France

Abstract

The assessment of durability of construction materials and structures subjected to physical and/or chemical evolutions (hydration, ageing, chemical degradations,...) requires multiphysics approaches (chemo-mechanical couplings, heat and mass transport, reactive transport,...) for which evolution laws can be identified by understanding the evolution of material microstructure. It appears important to link microstructure and macroscopic behavior by multiscale investigation of the material performances. The recent developments in terms of microstructural characterization allow a better understanding of the mechanisms at small scales and enhance durability predictions of construction materials and structures at larger scale. The aim of this mini symposium is to address recent studies and developments in multiscale and multiphysics approaches, from an experimental, theoretical or numerical point of view, to understand and predict the behavior of construction materials and structures subjected to chemical, thermal, hydric and/or mechanical loadings.

Keywords: Construction Materials, Durability, Degradation, Multiscale & Multiphysics modelling and experiments

*Speaker

[†]Corresponding author: abouchak@insa-toulouse.fr

[‡]Corresponding author: laurie.lacarrière@insa-toulouse.fr