

Numerical Modeling of Coupled Problems in Geo- and Durability Mechanics

The Minisymposium is concerned with advances in numerical modelling and computational methods for the solution of coupled problems occurring in geo- and durability mechanics. While in environmentally oriented geotechnical applications transport mechanisms of various interacting species in porous media are receiving great attention, durability mechanics is characterized by the modeling and simulation degradation processes of materials and structures such as chemically induced corrosive mechanisms (e.g. leaching, alkali-silica reaction, carbonation, sulphate attack, corrosion, etc.) and physical processes (e.g. drying induced shrinkage, creep, freeze-thaw action, high temperature etc.) and their interactions with external loading. Due to various interacting mechanisms between thermal, hygral, chemical and mechanical processes, model-based simulations considering these couplings are critical for reliable predictions in geo-environmentally and durability oriented engineering.

The objective of this minisymposium is to discuss recent advances in computational multilevel, multiphase and multifield modelling of (porous) materials and structures involved in geo- and durability engineering. Emphasis is laid on the synthesis of mathematical modeling of transport and long-term degradation of materials at various levels of observation (from the nano to the macro-level) together with related homogenization techniques to bridge various scales and efficient simulation techniques for life time oriented multifield analyses. Computational issues include new methods for the discretization of multifield problems in space and time as well as related issues, such as parameter identification, stochastic modelling, reliability analysis and advanced finite element methods used for the description of localized damage such as cracks, shear bands.

Please contact:

Günther Meschke
guenther.meschke@rub.de

Xikui Li
xikuili@dlut.edu.cn