

Effective Models for Coupled Flow and Chemistry in Porous Media With Very Small but Evolving Spherical Inclusions

We study a coupled fluid–chemistry system consisting of the incompressible Stokes system and a reaction–advection–diffusion equation in a bounded domain perforated by small spherical inclusions of radius ε^α with ε a small scale parameter and $\alpha > 1$.

Due to adsorption and dissolution processes at the interface of these balls, they might grow or shrink in size over time resulting in a moving boundary problem. We utilize a fixed-point argument to show existence and uniqueness of weak solutions for a small (but ε -uniform) time interval and discuss the limit process $\varepsilon \rightarrow \infty$.

This talk is based on ongoing work with Richard Höfer.