Contribution ID: **200** Type: **Poster Presentation**

Film-to-pore filling transition during water adsorption in nanoporous media

Thursday, 2 June 2022 15:15 (1h 10m)

Multiphase fluid behavior in nanoporous materials is of interest for various science and engineering applications, including geoscience applications, chemical and material engineering, and biological sciences. In the context of geoscience applications, nanoporous rocks have considerable importance as low-permeability seals for geologic carbon sequestration or nuclear waste disposal and as source rocks for hydrocarbon fluids. Improved knowledge of the fundamental interactions of fluids with nanoporous rocks would have significant energy, water and environmental benefits. When the pore sizes approach nanoscales, the impact of the molecular interaction forces between fluids and solids becomes increasingly important. These forces can alter macroscopic fluid phase behavior and control transport. In this work, we have conducted theoretical and computational investigations to understand the processes controlling adsorption, condensation and imbibition in nanoporous media. Our theoretical model, based on the square-gradient classical density functional theory, explicitly includes the relevant interaction forces among fluids and solids in nanoporous media. We will present applications of the model at pore-scale and macroscopic-scale to predict the impacts of water-pore wall attractive forces on multiphase water behavior and transport in nanoporous media.

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Participation

Unsure

Primary author: CIHAN, Abdullah (Lawrence Berkeley National Laboratory)

Co-authors: Dr TOKUNAGA, Tetsu (Lawrence Berkeley National Laboratory); BIRKHOLZER, Jens (Lawrence Berkeley National Laboratory)

Presenter: CIHAN, Abdullah (Lawrence Berkeley National Laboratory)

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