Geochemistry and Reactive Transport in Shale Nanopores

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Shales have become increasingly highlighted in our search for unconventional gas and oil resources, storage of CO_2, and disposal of nuclear waste. Complex nanopore structures and surface properties pose a challenge in understanding the coupled multiphysics involved in non-Darcy fluid flow and reactive transport within this important rock type. In addition, a better understanding of geochemical and environmental reactions is essential to designing safer energy-related subsurface operation strategies, predicting their performance, and assessing potential risks. This session seeks contributions with a focus on water/shale/gas interactions, geochemical tracers (isotopes, organics, metals), and water chemistry for understanding the mechanisms and processes involved in generation, migration, trapping, and recovering of these resources in unconventional low-permeability systems. We welcome imaging, experiments, and modeling contributions from the molecular to the continuum scale. Topics of interest include, but are not limited to, reactive transport, mineral-brine interactions, the properties of water, adsorption, osmotic effects, and nanopore and brine chemistry related to shale gas extraction and geologic storage of CO_2 and nuclear waste disposal in shale.

Symposium Organizers:

Young-Shin Jun (Washington University in St. Louis; ysjun@seas.wustl.edu)

Louise Criscenti (Sandia National Laboratory; ljcrisc@sandia.gov)

Hongkyu Yoon (Sandia National Laboratory; hyoon@sandia.gov)

Thomas Dewers (Sandia National Laboratory; tdewers@sandia.gov)

Yifeng Wang (Sandia National Laboratory; ywang@sandia.gov)