ABSTRACT

"Fine-grained sedimentary rocks (shale, mudstone) play important roles in global CO2 abatement efforts through their importance in carbon capture and sequestration, radioactive waste storage, and shale gas extraction. These different uses of fine-grained rocks, however, rely on seemingly conflicting premises regarding the sealing properties of shale and mudstone. A compilation of experimental data is used to demonstrate that clay mineral mass fraction is an important variable controlling the material properties of these rocks. A threshold at a clay mineral mass fraction of ~1/3 separates fine-grained rocks with very different properties. This threshold coincides with the predictions of a simple conceptual model of the microstructure of sedimentary rocks and is reflected in the uses of shale and mudstone formations."

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