The goal of this research is to understand the complex interplay of transport and storativity in nano-porous shale formations. The potential of carbon storage and enhanced gas recovery using single and multi-component preferential adsorption studies is examined through original custom designed static and dynamic experimental setups. Results were validated with a molecular simulator and confirmed using a novel multiscale imaging workflow of storage capacity. This work improves our fundamental knowledge on the physical and flow characteristics of shale reservoirs and is essential for accurate reserve estimation, future production forecasts, and ultimately improved field development and planning.

Composite upstream and downstream pressure profile with He, N₂, CH₄, and CO₂ on Barnett 26-Ha.

Multi-scale image registration of CO₂ storage capacity on Eagle Ford EF-4.

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