

A Critical Appraisal of CO₂ Entrance Pressure with Heat

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Abstract : In this study, changes in capillary entry pressure of shale, as it interacts with CO₂, under different temperatures (25 °C to 250 °C) have been investigated. The combined impact of temperature and petrophysical properties (water content, water activity, permeability and porosity) of shale was also addressed. Results showed that the capillary entry pressure of shale when it interacted with CO₂ was highly affected by temperature. In general, increasing the temperature decreased capillary entry pressure of shale. We believe that pore dilation, where pore throat size expands due to the application of heat, may have caused this decrease in capillary entry pressure of shale. However, in some cases we found that at higher temperature some shale samples showed that the temperature activated clay swelling may have caused an apparent decrease in pore throat radii of shale which translates into higher capillary entry pressure of shale. Also, our results showed that there is no distinct relationship between shale's water content, water activity, permeability, and porosity on the capillary entry pressure of shale samples as it interacted with CO₂ at different temperatures.

Keywords : heat, threshold pressure, CO₂ sequestration, shale

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