Abstract Submitted
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Experimental study on the phase behavior of fluids confined in nanoporous media[1] XINGDONG QIU, Department of Petroleum Engineering, University of Wyoming, 1000 E. University Avenue, Laramie, WY 82071-2000, USA, SUGATA P. TAN, Planetary Science Institute, Tucson, Arizona 85719-2395, USA, MORTEZA DEJAM, HERTANTO ADIDHARMA, Department of Petroleum Engineering, University of Wyoming, 1000 E. University Avenue, Laramie, WY 82071-2000, USA — Phase behavior of fluids in nanoporous media is of great significance in science and engineering applications and has direct and crucial implications in disciplines like drug delivery, supercritical extraction, CO_2 sequestration, and hydrocarbon production and recovery enhancement from unconventional reservoirs, *e.g.*, tight shale formations. It has been well-known that confinement can play an essential role on the abnormal physical behavior of nano-scaled fluids, compared to their counterparts in bulk space. Recently, we developed a new isochoric method using a high-pressure Differential Scanning Calorimeter (DSC) to measure the phase transition of both pure substances and mixtures confined in nanoporous media (SBA-15 matrices with different pore diameters), which turns out to be quite straightforward and reliable. Particularly, this method allows us to achieve detailed insights with regard to the criticality of confined fluids as well as the heat involved during capillary condensation, both of which have hardly or even never been experimentally explored, especially with confined mixtures. The results demonstrate that confinement can shift the critical point of fluid and have an appreciable effect on the heat released during phase transition.

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