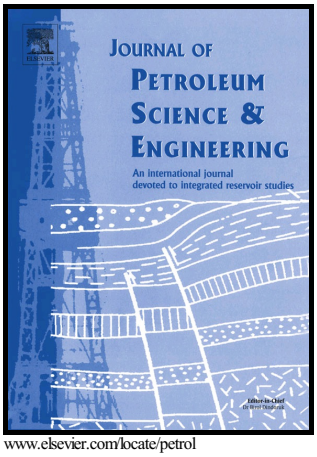

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The critical buoyancy threshold for tight sandstone gas entrapment: physical simulation, interpretation, and implications to the Upper Paleozoic Ordos Basin

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Abstract

Tight sandstone gas is regarded as a significant unconventional resource. One intriguing problem for tight sandstone gas accumulation is how gas was trapped in the tight-sandstone reservoirs. In this paper, we attempted to look for a reasonable explanation for this, which has attached great theoretical and practical significances. In this study, a dynamic equilibrium equation characterizing the critical buoyancy threshold (CBT) was established based on physical experiments, and the formation mechanism of tight gas and CBT were discussed. The explanations were further testified through the tight-gas reservoirs of the Upper Paleozoic Ordos Basin. A dynamical CBT occurs during the charge process in tight-gas reservoirs, and water-gas inversion with separating phases is dominated before natural gas reaches the CBT. At this stage, the driving force for gas movement is abnormal gas pressure, and