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Analysis of CO₂ huff and puff displacement effect of shale oil in Block A

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In response to the low porosity and permeability of shale oil reservoirs in Block A, as well as the difficulty in producing shale oil, nuclear magnetic resonance experimental technology and high-temperature and high-pressure CO₂ huff and puff experimental technology were used to study the effects of shale oil huff and puff pressure, extraction rate, maturity, and shale oil composition on CO₂ huff and puff oil recovery efficiency, and to explore the occurrence characteristics of shale pore fluids in the T1-T2 two-dimensional spectrum. The experimental results show that the rapid extraction of shale oil is 7.43 percentage points higher than the slow extraction, but excessive pressure drop in the formation can cause strong stress sensitivity, and the actual production process needs to optimize the extraction speed; The extraction rate of high maturity shale is 11.13 percentage points higher than that of low maturity shale. Optimizing favorable desserts for development is an effective method for energy conservation and efficiency improvement; When the throughput pressure approaches the formation fracture pressure, it can significantly increase the shale oil recovery rate; After CO₂ huff and puff, shale oil still retains immovable oil in large pores and bedding fractures in the T1-T2 two-dimensional spectrum.

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