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# Study on Injection-Production Characteristics of CO<sub>2</sub> Flooding in Fractured Extra/Ultra-low Permeability Reservoirs

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**Abstract:** Clarifying the injection-production characteristics during CO<sub>2</sub> flooding in fractured extra/ultra-low permeability oil reservoirs is significant for further improving oil recovery. This study focuses on the fluid and reservoir characteristics of ultra/low-permeability oil reservoirs in the Changqing Oilfield. Under the conditions of formation temperature and pressure in the target block, long core experiments and two-dimensional heterogeneous plate large rock model displacement experiments were carried out to explore the effects of permeability and fractures on the swept efficiency of water flooding and CO<sub>2</sub> flooding. The swept characteristics and migration law of CO<sub>2</sub> in extra/ultra-low permeability reservoirs with fractures and high permeability zones after water flooding are deeply understood. The research shows that: ① The development of micro-fractures is not conducive to the expansion of the swept volume of CO<sub>2</sub> flooding. Compared with homogeneous cores, the recovery rate of CO<sub>2</sub> miscible flooding after water flooding in one-dimensional fractured long cores is reduced. ② The injection capacity of CO<sub>2</sub> miscible flooding is obviously higher than that of water flooding, and the displacement front is obviously more uniform than that of water flooding, which can effectively displace the remaining oil in the matrix. ③ The development of fractures and high permeability zones will lead to uneven distribution of remaining oil after water flooding, and CO<sub>2</sub> breaks through earlier along the dominant channel, which seriously affects the swept volume of CO<sub>2</sub> flooding. ④ CO<sub>2</sub> large PV miscible flooding can still produce oil continuously at high gas-oil ratio and greatly improve the recovery rate.

**Keywords:** extra/ultra-low permeability reservoirs; fractures and high permeability zones; CO<sub>2</sub> miscible flooding; injection-production characteristics

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