Characteristics and formation mechanism of Chang 7 tight sandstone oil reservoir in Ordos Basin, China

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Abstract Body: Tight sandstone reservoirs develop extensively in Chang 7 Member in Longdong area, Ordos Basin, China, and tight oil is abundant. Unconventional tight sandstone reservoirs need a special experimental techniques and analysis methods, which is different from the conventional reservoirs of high porosity and permeability. This study adopted tight rock analysis (TRA), nuclear magnetic resonance (NMR), core and thin section observation, and formation micro-Scanner image (FMI) materials, in order to characterize the reservoirs precisely. The formation mechanical of tight sandstone reservoirs were then analyzed on this basis .

The results of the experiments show that: (1) Destructive diagenesis is very strong and effective porosity, bound hydrocarbon (% of BV) decrease with depth. The physical property is poor due to high hydromica content, whose average value is 10.4%. (2) According to the centrifugal experiment, this study sets 0.1μm as the lower limit of pore throat of tight sandstone reservoirs, which is consistent with high pressure mercury data. (3) The movable fluid saturation is high, whose average value is 55%, and the correlation between movable fluid saturation and porosity and permeability is poor, whose correlation coefficient is 0.24 and 0.70, respectively. (4) Chang 7 tight sandstone reservoir is prone to be fractured and favorable for later recovery due to high content of quartz, whose average value is 40.4%, the micro-cracks develop widely and they greatly improve the oil and gas migration and accumulation capacity.

The formation mechanism of tight sandstone reservoirs are：mechanical compaction, pressure solution, cementation, metasomatism, the control of sedimentary micro-facies and interstitial material.