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Study on water flooding seepage regularity of low permeability carbonate reservoir —Taking Middle East H oilfield as an example

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Abstract: Low permeability carbonate reservoir generally contain multiple types pore structure as matrix pore, hole and crack, which lead to significant difference in water flooding seepage regularity and great perplex in oilfield production. In order to relate pore structure to seepage regularity of core samples preferably, micro-CT scanning and scanning electron microscope advanced experimental technology were used to quantitatively describe pore structure parameters of carbonate reservoir, and divided reservoir types according to space proportion of different pore structure types. On this basis, same rock samples water flooding experiment was carried out to study the seepage characteristics regularity. Results show that this three methods are complementary in reservoir type division, and are able to meet the need of low permeability carbonate reservoir layer type in the Middle East by comprehensive analysis of the experimental data. The reservoir was divided into three types of pore structure including pore type, fracture pore type and fracture type, pore type and fracture pore type reservoir take up the large part, a few of crack type. Oil-water relative permeability curve is nearly X. Irreducible water saturation is 25% on average, and the average residual oil saturation is 32%. According to water flooding seepage characteristics, the anhydrous displacement efficiency is 15% on average, and the total displacement efficiency is 48% on average. The rise of water cut is relatively slow. The research have important guiding significance for understand and guide the production regularity of such reservoirs.
Key words: carbonate reservoir, X-CT, reservoir type, seepage regularity

References

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