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PROCEEDINGS

Experimental Study on the Flow Conductivity of Acid Fracture in Permian Cloud-Ash Interacting Reservoirs in the Sichuan Basin

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ABSTRACT

China's marine carbonate rocks are widely distributed, the reservoir is deeply buried, high temperature, high closure pressure, and the reservoir has strong non-homogeneity, porosity and permeability are generally low, while the natural cracks and dissolution pore (hole) is more developed. Currently, carbonate reservoir reforming technology is developing rapidly, and more and more marine carbonates can be developed. The Permian Maokou-Qixia Formation in the Sichuan Basin has good hydrocarbon source rocks of marine carbonates. The Longniusi Hechuan block of Permian Maokou-Qixia Formation develops a set of carbonate reservoirs interacting with leopard dolomite and mud crystal clastic tuffs, with complex reservoir rock types and large differences in reservoir space and physical properties, which leads to unclear understanding of acid fracture inflow capacity during acid pressure reforming. In this paper, we mainly study the changing law of acid-etched fracture flow-conducting ability under different proportion of dolomite and tuff, analyze the influence of fracture wall morphology on fracture flow-conducting ability, and study the changing law of different types of acid on flow-conducting ability and fracture wall morphology, which is a guideline for the selection of acid system for the subsequent acid-pressure work in the target work area. This paper summarizes and analyzes the rock types and physical characteristics of the Permian Maokou-Qixia Formation reservoir in Hechuan Block by using X-diffraction analysis and thin-section appraisal, carries out experiments on acid-etched fracture flow-conducting ability and acid-etched fracture surface morphology characterization experiments, and obtains the change rule of the acid-etched fracture flow-conducting ability and the morphology characteristics of acid-etched fracture surfaces under the action of gelatinizing acid-etching with different dolomite contents and also analyzes the reforming effect of different types of acid fluids. The effect of different types of acid is also analyzed. The results show that the more dolomite content, the lower the reaction rate of acid rock, the greater the flow-conducting ability, and the greater the extreme deviation and standard deviation of the descending height. The rock sample with 70% dolomite content has the best effect of acid transformation, the reaction rate of acid rock is the largest, the reaction rate is 5.36×10-6mol/(cm2•s), the change of conduction capacity is the largest after acid etching, the conduction capacity increases by 2.9D•cm, and the change of the average descent height is the largest, the descent height is 1.99mm.

KEYWORDS

Dolomite content; conductivity; acid rock reaction; surface morphology

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