Rock Properties and Pore Classes Based on Core Analysis in Carbonate Reservoir by using CT Scaning

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Summary

Carbonate reservoirs contain significant hydrocarbons in the world and consist of 30% of the world's sedimentary rocks (limestones and dolomites). The processes of precipitation, lithofication and diagenesis, particularly dissolution, produce a wide range of pore classes, resulting in a complex pore distribution and pore connectivity in carbonate rocks. Core analysis by CT Scanning is the methodology of choice to measure the pore classes and reservoir properties.

Salinity, temperature, pH and the amount of calcium carbonate (organic and inorganic) of water can control the types of carbonate facies. As a result of different types of carbonate facies, there are different rock properties. Because of their reactive nature, carbonates go through a more complicated deposition and diagenesis compared to siliciclastic sandstones. Precipitation, diagenesis and dissolution of carbonates can control pore classes.

New research has recognized the role of dissolution in carbonate rocks through sedimentation, lithofication, and diagenesis. The different fluid pH levels in the rock achieve various dissolution scenarios. Carbonate formations generally have various complex structures. Therefore, in comparison to sandstones, there are not enough works published in the literature. Hence, it is necessary to do additional research on carbonate reservoirs.

The experimental study of this core analysis research is to characterize reservoir properties. Core samples are prepared from the AB-Teymur oil field of Iran. Rock properties and pore classes are obtained by conducting different runs on various core samples.

Pore classes and pore connectivity, in heterogeneous and complicated AB-Teymur carbonate reservoirs is presented. Hence there are different compositions and minerals in carbonate rocks. Pore classes analysis in carbonates sheds light on the pore structure. Consequently, complicated pore structure in carbonate rocks affects pore classes, and also increases the vuggy, moldic, channel, and cavernous porosity. These can lead to changes in permeability as well. The prediction of pore classes can clarify the problems which are regularly a critical control on reservoir quality.

This imperative contemplate gives a better description of pore classes and connectivity by using X-ray CT scanning in core plugs of carbonate reservoir that has been a bigger challenge than

sandstone. The results of this study can be used to improve production and recovery of oil and gas in carbonate reservoirs.

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