



The Influence Factors Analysis and Characteristics Research of Shale Wettability

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Shales have become one of the leading unconventional oil and gas resources in the world today. The wettability is an important indicator of the rock that reflects the lipophilic and hydrophilic which not only affect oil and water distribution but also can affect the capillary pressure, relative permeability and irreducible water saturation. We present a study of shale wettability using Nuclear Magnetic Resonance (NMR) to monitor sequential imbibition of brine and oil (Dodecane). A total of eleven shale samples of Jiyang Depression of China were analyzed and compared abundance of organic matter, the movable hydrocarbon content, clay content and carbonate content with different wettability.

The results showed that the contents of total organic carbon (TOC) with mixed wetting characteristic of shale samples are greater than just water wetting characteristic of shale samples that shows with the increase of TOC content, porosity can be convert into oil wetting by water wetting and the inorganic pores convert into organic pores. It indicates the presence of organic matter is the root cause of mix wettability with the organics contributing mainly to the oil-wetness of the shale samples. The samples that have oil-wetness are higher than the samples only water wetting on movable hydrocarbon contents and clay contents which shows the organic matters are accompanied with clay in the study area. But the samples that only for water wetting have the higher carbonate contents than the oil-wetness samples which indicate the inorganic pores are mainly formed by carbonate rocks. In summary, the shale reservoirs with mix wettability can be used as shale oil enriched favorable exploration targets.