

## **Experimental Methods of Micro Pore Structure Characterization of Tight Sandstone Reservoir-Taking Shahezi Formation in Xujiaweizi Depression as an Example**

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### **Abstract**

Tight sandstone reservoir is a kind of unconventional reservoir. Researchers have different definitions of tight sandstone reservoir, which is defined by Chinese scholars with low permeability (<0.1mD) and low porosity (<10%). According to the investigation, there are no systematically studies of the microstructure characterization of compact sand conglomerate reservoir. Furthermore, conventional single experimental method is very difficult to characterize pore throat structure comprehensively of the reservoir. In order to transform qualitative to quantitative, a variety of experimental methods, including nuclear magnetic resonance technique and cryogenic nitrogen adsorption experiment and high pressure mercury injection, were combined to characterize the micro pore structure which is the relationship of the geometry, size and distribution of the pores and throats in reservoir rocks in Shahezi Formation of Xujiaweizi Depression in Songliao Basin of China. Pore structure distribution characteristics are directly related to the distribution of the NMR T2 peaks that can be used to construct capillary pressure curves.

The calculation results showed that NMR pore size distribution curves are similar with nitrogen adsorption's and mercury injection's, which covered the shortages of previous studies that smaller pore size had low precision. The main pore size of tight sandstone reservoirs of Shahezi Formation range from 10nm to 10  $\mu$ m. Distribution curves are always bimodal curves. It is more than 80% that the pore size is less than 1  $\mu$ m. All of above, the pore size is small and thin, mainly nanometer pores in research area.