EVALUATION AND PREDICTION OF CORE AREA FOR THE LOWER PALEOZOIC SHALE GAS IN CHONGQING, SOUTHWEST CHINA

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Shale gas exploration in lower palaeozoic era of Chongqing area is still in its infancy and geological conditions of shale gas accumulation are still unclear. It is important to evaluate shale gas potential, gas content, geochemistry, reservoir and preservation. Evaluation and prediction of 20 blocks were performed in Chongqing area.

Automatic shale gas desorption instrument and PRP- Ⅰ residual gas analyser (patented) were developed. The field desorption experiments were performed on the cores of 14 wells in Chongqing area. It is great significant to reveal shale gas desorption law and residual gas characteristics. Shale samples of the Lower Paleozoic from Chongqing area, we completed measurement of TOC, maceral, methane adsorption, stable carbon isotope. And samples were examined using scanning electron microscopy (SEM), thin section, and X-ray diffraction.

Results reveal that the gas content of Lower Cambrian shale in southeast of Chongqing is low. The shale of the Upper Ordovician Wufeng Formation - Lower Silurian Longmaxi Formation in Chongqing has high gas content. The Lower Silurian Longmaxi shale in Jiaoshiba structure has higher gas content in Chongqing area. The gas content decreases toward southeast. The Lower Cambrian shale in northeast of Chongqing has high gas content, but the gas content has significantly vertical and horizontal variations. The shale of the several formations mentioned above in Chongqing has a high TOC content, high-over maturity, well developed organic-matter pores, and high content of brittle minerals. Intraparticle pores and intercrystal pores contribute a lot to inorganic pores at micro-nanometer scale. In addition, there are many tectonic styles, which are great significant to the shale gas accumulation. By analyzing the parameters from 4 wells of Lower Silurian shale and comparing the geological characteristics of the shale gas-rich blocks between China and the US, the controlling factors of shale gas accumulation were revealed. The regularity of shale gas accumulation and optimizing method system of core area of shale gas were established. The regularity and optimizing method system were applied in 20 blocks in Chongqing area and 4 favorable kinds of blocks were concluded.