

Coal measure rocks evaluation of the Pan-Sanjiang Basin in northeastern China

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With the rapid development of petroleum exploration technologies, a growing number of coal oil-gas reservoirs were found in the coal basins around the world: exemplifying Canadian Mackenzie Basin and Indonesian Ma Hakan Delta. Nonetheless the Pan-Sanjiang Basin encircling the Chinese biggest oil field—Daqing oil field, known for coal accumulating region, has not been carried out a systematic research on source rocks evaluation due to data limitation.

The Pan-Sanjiang Basin with an area of 13 times of Daqing oil field, is one of the most significant coal-rich regions in China, which is formed during the Early Cretaceous and located in the sedimentary basin groups in northeastern China. Currently this basin is composed of Sanjiang basin, Shuangyashan basin, Boli Basin, Hulin Basin, Jixi basin, Ningan Basin. The main source rocks were the Formation Chengzihe (Qihulinhe + Yunshan) and Formation Muleng (Zhushan) source rocks from Lower Cretaceous with widespread, and the accumulative depth was over 1000m in some regions.

During this research, the recent samples testing has yielded data on TOC, IH, A, R_o , T_{max} . Integrating new data and previous data with new organic macerals analysis, the main source rocks were evaluated overall in terms of organic richness, organic maturity, kerogen type.

The results show that the main source rocks of Formation Chengzihe (Qihulinhe + Yunshan) and Formation Muleng (Zhushan) from Lower Cretaceous were coal measure rocks, including mudstone, carbonaceous mudstone and coal. The mudstone samples in coal measure rocks have the ranges of organic richness from general level to medium level, the carbonaceous mudstone samples with the ranges from medium level to high level, and the coal samples with high level. The kerogen types of the samples were found to be Type III dominantly, with a small number of Type II2 and Type I. The thermal maturity of the samples were characterized by maturity stage, with a good hydrocarbon generating potential, which was favorable for the large-size gas field forming in the Pan-Sanjiang basin.