Characteristics of shale oil reservoirs in Qianjiang Formation, Qiangjiang Depression, Jianghan Basin, China

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The Jianghan Basin is a typical eastern fault depression salt lake basin in China, in which the Paleogene strata of the Qianjiang Sag are rich in shale oil resources. As a salt lake sedimentary basin, the developed Qianjiang Formation is a set of inter-salt oil-bearing strata, in which the salt rock strata are especially developed. There are many salt rhythms in the study area and a salt rhythm consists of a argillaceous dolomite layer between a salt rock formation and a salt rock formation. This study focuses on the 10th rhythm of the Qian 34 section of Qianjiang Depression (Eq3410). The samples were investigated by organic geochemical analysis and X-ray diffraction, and the pore structure characteristics of the reservoir were studied by argon ion polishing scanning electron microscope and low temperature nitrogen adsorption test. The research indicates that the average TOC of Eq3410 in Qianjiang Depression is 2.11% and the main distribution is 1%~3%; the type of organic matter is mainly Type II2 and Type II1; the overall maturity of organic matter is low maturity stage(Tmax is 412~441℃with an average of 423℃). The XRD data indicates that the mineral composition of the Qianjiang Formation shale oil reservoir is complex and have strong heterogeneity(quartz content in 2.3%~18.6% with an average of 9.5%, calcite content in 6.9~43.8% with an average of 12.8%, dolomite content in 2.5%~ 61.2% with an average of 27.2%, clay mineral content in 1.0%~45.2% with an average of 20.5%, glauberite content from 7.1% to 92.7% with an average of 22.9%). The pore types of shale oil reservoirs in Qianjiang Sag are complex and diverse and mostly are intergranular pores, which are mainly developed between detrital minerals or between detrital minerals and carbonate minerals. In carbonate mineral particles and quartz particles, some intragranular pores are visible, including calcite dissolution pores, internal pores of calcite and clay minerals, and internal pores of pyrite particles. And organic pores are rare in reservoirs due to the low maturity(Ro ranges between 0.5% and 0.7%). Nitrogen adsorption experiments showed that the pore size distribution of Eq3410 samples was dominated by mesopores and macropores. And the pore volume of the Eq3410 sample was most affected by the macropore pore volume, averaging 66.22%, followed by the mesopore pore volume with an average of 31.45%. To study and understand the characteristics of shale oil reservoir in Qianjiang Depression is conducive to mastering the regularity of shale oil enrichment and provides a basis for the exploration and development of shale oil.