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Pore Structure Research and Application of Rate-controlled Mercury Penetration at Chang 7 Tight Oil Reservoir at Ordos Basin

Xu Zhu, Qun Luo, and Putao Wang

China University of Petroleum (Beijing), Beijing, China; zhuxu1005@163.com

As the key and difficult points of research on tight oil reservoir, the characteristics of microscopic pore-throat structure also restrict the development of tight oil. Analysis was carried out on the microscopic pore-throat structure of tight sandstone reservoir by using rate-controlled mercury penetration technology. In rate-controlled mercury penetration experiment, by inspecting the mercury injection process, the pressure fluctuation can show the development condition of throat and pore as well as the size of the throat and pore and their distribution characteristics. According to the research results, Chang 7 Reservoir in the research area is a typical tight sandstone reservoir whose average permeability is 0.32mD and average porosity is 7.36%. It is a low porous tight oil reservoir. The results of rate-controlled mercury penetration test show the follows: as the average radius of the pore is 100~200 μm , the pores are small and medium-sized; as the average radius of throat is 0.1~0.6 μm , the throats are mainly tenuous throats. The permeability of Chang 7 Reservoir of Yanchang Formation is poorly correlated with the pore radius, and is positively correlated with the throat. The experiment indicates that the percolation ability of the reservoir is mainly controlled by the average radius of throat and its distribution pattern, which explains that the throat is a key factor which affects the percolation ability and development effect of the reservoir.

