

Quantitative Evaluation of Different Mineral Pores and Effective Reservoir Space in Tight Sandstone Gas Reservoir

Fang Zeng, Shansi Tian, and Chunmei Dong

China University of Petroleum (East China), School of Geoscience, Qingdao, China (woshizengfang@outlook.com)

Effective reservoir space in tight sandstone gas reservoir refers to the effective pore volume which can store up gas. When a layer of water film is adsorbed on the surface of rock mineral particles, the tight gas cannot occupy the space where the water film is located. When calculating the effective reservoir space of tight sandstone gas reservoir, this part of water film volume needs to be removed from the total pore volume. Previous researchers mainly used the change of water content before and after centrifugation in the rock, combined with specific surface area, to calculate the thickness of water film. However, when applying this to geological rock samples, the influence of mineral types was not considered during the procedure which would affect the thickness of water film and the effective reservoir space. In this study, scanning electron microscopy (SEM) and EDS energy dispersive spectroscopy (EDS) experiments of tight sandstone gas reservoir rocks were carried out. Pores were extracted by edge detection method combined with threshold method. Quantitative evaluation methods of different mineral pore were established. The mineral composition ratio of each pore surface was counted, and the water film thickness of different minerals was calculated according to the minerals composition on the pore surface. Quantitative calculation of water film thickness on pore surface and determination of effective reservoir space lay a foundation for reservoir evaluation.