

Coal forming environment of low-rank coal seam in Sandaoling mining area, Turpan-Hami Basin

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As an unconventional natural gas, coalbed methane (CBM) has important significance for the sustainable development and transformation of traditional energy sources. Pores and fractures in coal seams are the main storage space for CBM, and the depositional environment controls the development of coal seams and it also has an impact on the adsorption of CBM. Tuha Basin in northwest China has a wide distribution of thick coal seams, which storing abundant low-rank coalbed methane resources. However, the research on coal reservoirs is not enough to support the exploration and development of local resources in this area. The study area of this research is located in the Sandaoling mining area of Tuha Basin, and the target coal seam is the Middle Jurassic Xishangyao group 4# coal. In this research, we measured the microcomponent content, coal quality parameters content and geochemical elements content of nine coal samples, and classified the coal forming environments into two categories: Dry forest swamp and moist herbaceous marsh. (1) The coal forming environment type of the top and bottom coal seams is dry forest swamp. Water recharge in the environment was provided by both atmospheric precipitation and subsurface runoff, and the ash and sulfur content of the water was low. The main plant type in the environment was woody plant. The coal seams formed during this period have a high content of inertinite, and the macrolithotypes are dark and semi-dark coals. (2) Moist herbaceous marsh was the main type of peat swamp in the middle period of coal formation. During this period, the climate was arid and the water level in the marsh was high. Atmospheric precipitation was the main way to provide water to the marsh. The coal forming environment was a reduced environment, and the plant type was mainly herbaceous. The coal samples formed in this coal-forming environment have a high content of vitrinite, and the macrolithotypes are bright and semi-bright coals.