GAS PORES IN PERMO-CARBONIFEROUS COAL OF DONGPU DEPRESSION AND THEIR IMPLICATION FOR HYDROCARBON GENERATION AND ACCUMULATION, BOHAI BAY BASIN, CHINA

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Dongpu Depression lies in the south of Bohai Bay Basin in China. There are two successions of source rocks in the depression: the upper is the Oligocene Shahejie Formation which is the oil-prone source rock; the lower one is the Permo-Carboniferous coal source rock which is the gas-prone source rock.

The authors obtained 40 coal samples of Permo-Carboniferous stratum from 9 wells. Using a Scanning Electron Microscope (SEM), these coal samples were analysed and 97 photos of coal micro-texture were taken. Interpretation of results suggests a significant amount of gas pores exist and these will impact natural gas production. Most of the gas pores are developed in the vitrinite, and some in the cutinite. The shapes of most of the gas pores are circular or near circular although other shapes such as ellipse, spindle, irregular shape and honeycomb, exist. Their sizes range from 0.05\textmu m to 3.75\textmu m. According to their size, gas pores can be classified into 8 groups. In this paper the cause of gas pore formation are also discussed.

The implications for natural gas production and accumulation include: A. The vitrinite is the primary gas-production material due to most of them having gas pores. Gas pores are also found in the cutinite but to a lesser extent, suggesting that cutinite is the secondary gas-production material; B. The pattern and shape of the gas pores are important to the migration and accumulation of the gas formed from the coal. The spherical gas pores are closed, thus the coal-formed gas inside them cannot migrate out. However the tubular gas pores, especially the irregular and honeycomb, favor the coal-formed gas to migrate and to form natural gas pools, such as the Wenzhong gas pool and Machang gas pool in the depression; C. The gas pore ratio (the number of gas pores in unit area) can be used to evaluate the natural gas’s perspective; D. integrated study on the gas pores’ development status vertically and laterally, the ratio, the group number and the shape is beneficial for the prediction and prevention of gas outburst and explosion in coal mining.