Contribution ID: **294** Type: **Poster**

Characteristic of Coal Pore Structure and Its Relationship with Sedimentary Environment in Hegang Basin

Tuesday, 15 May 2018 18:30 (15 minutes)

Characteristic of Coal Pore Structure and Its Relationship with Sedimentary Environment in Hegang Basin
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Abstract:Base on low temperature nitrogen adsorption method, Argon Ion milling Scanning Electron Microscopy and Nuclear Magnetic Resonance, the characteristics of pore structure and sedimentary environment are discussed to find the relation between them.The result show that four pore models are established through analysis on pore structure features of Hegang Basin, and they are corresponding to different mine areas respectively. Micropores are dominated for the most part and the small pores take the second place in Hegang Basin, with stronger adsorption capacity. However, the significant difference exists in the influence of different pore models on CBM desorption and filtration. Pore Model I has relatively independent pores with easy desorption but poor filtration capacity. Pore Model II, III and IV have relatively strong adsorption capacity, but the latter two enjoy more developed net fractures. This is of great significance for improving permeability, and beneficial to CBM output. The coal facies are forest and marsh covered area in the south of Hegang Basin, which is in transition to shallower and deeper water-covered marshes. Vitrinite/inertia (V/I) ratio increases from south to north, while ash content and total sulfur content are on the contrary, indicating the burial speed accelerates coal forming environment with water-covered deepening. The fan delta plain is the main coal accumulating environment in the middle of the Basin, and the provenance pours in from the south of the Basin, extending to the northeast through a braided riverway, so that stable thick coalbed can be formed easily in the north mine areas in the Basin.The sedimentary environment has a control effect on coalbed pore structure and fracture development to some extent. From south to north in Hegang Basin, the water body becomes deeper and deeper, and the coal model IV has a gradual transition to Model I; the coarse lithological association become the fine one, and ash content decreases. The high ash content causes part of pores to be filled, so that the pore system becomes diversified and complicated. The water power is ever-increasing in the south, and near provenance, turbulent water body allows peat cracks to gradually increase in quantity and scale in the burial process. The coal seam is thick in the north and thin in the south in Hegang Basin, and filtration capacity and operability of late transformation are strong in the south and weak in the north. Thus, when seeking advantageous targets in Hegang Basin, we should take into account macroscopic tectonic setting and microscopic features in an all-around way.
Key word：pore structure; pore model; coal facies; sedimentary environment; Hegang Basin

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Presenter: Mrs MAO, cui

Session Classification: Poster 2

Track Classification: MS 1.01: Multi-scale Particulates Transport through Porous Media Saturated with Multi-Phase Fluids