

## **Coking coals of Mongolia: Distribution and resources**

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The coal deposits of Mongolia tend to become younger from west to east and can be subdivided into two provinces, twelve basins, and three areas. Main controlling factor of coal rank is the age of coal bearing sequences. Western Mongolian coal-bearing province contains mostly high rank bituminous coal in strata from Late Carboniferous. The basins in southern Mongolia and the western part of central Mongolia have low rank bituminous coal in strata from the Permian. The northern and central Mongolian basins contain mainly Jurassic subbituminous coal, whereas the Eastern Mongolian province has Lower Cretaceous lignite. Mongolian known coking coal reserves are located in western, southern and northern Mongolia and related to Carboniferous, Permian and Jurassic sequences, respectively.

Pennsylvanian Nuurstkhotgor coal deposit is located in northwestern Mongolia (in Western Mongolian coal-bearing province). The coals have 1-7.5 crucible swelling number (CSN) and 0-86 G-index. Vitrinite reflectance value (R<sub>max</sub> in oil) varies from 0.7% to 1.2% and sulfur content is low, ranging from 0.3% to 0.6% with an average of 0.4%. Coal reserve is estimated to be 1.0 billion ton, of which half is coking coal.

Upper Permian Khurengol deposit is situated in western Mongolia (in Western Mongolian coal-bearing province). CSN and G-index of coal are 8-9 and 54-99, respectively. The coals have R<sub>max</sub> of 1.1 to 1.7% (average 1.4%) and sulfur content of 0.2 to 0.6% (average 0.4%). Coking coal reserve of the deposit is estimated to be 340 million ton.

Upper Permian Tavantolgoi, the largest coking coal deposit, lies in southern Mongolia (in South Gobi coal-bearing basin). The coals have CSN of 1 to 7.5 and R<sub>max</sub> of 0.7% to 1.2%. Sulfur content is low, ranging from 0.5% to 0.9%. Coal reserve is estimated to be 6.0 billion ton, of which 2.0 billion ton is accounted as coking coal.

Lower-Middle Jurassic Ovoot coal is located in northern Mongolia (in Orkhon-Selenge coal-bearing area). This is one of two Jurassic coking coals in Mongolia (the rest of Jurassic coals is subbituminous). Average CSN and G-index are 9 and 88, respectively. Vitrinite reflectance value ranges from 1.1% to 1.3% (average 1.2%) and sulfur content varies from 0.8% to 1.4% (average 1.0%). Coking coal reserve is estimated to be 281 million ton.

Pennsylvanian and Upper Permian coking coals have similar maceral contents (vitrinite 45-78 vol.%), whereas Jurassic coking coals have distinct petrographic composition, characterized by very high vitrinite content (>90vol.%). Thus, Jurassic coking coals have higher fluidity and plastic properties compared with Paleozoic coals.