Geochemical Characteristics of Rare Earth Elements in Jurassic Coals of Yan'an Formation from Huanglong Coalfield, Ordos Basin, China

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Rare earth elements in coals can indicate the nature of source rocks, sedimentary environments and epigenetic tectonic activity. In this paper, 14 bench samples (inluding 13 coals and 1 floor) of Jurassic coal of Yan'an Formation were collected from Wenjiapo Mine, Huanglong coalfield, Ordos basin, China to study the geochemistry of REY (REE+Y). The concentrations of rare earth elements and yttrium (REY) were determined by inductively coupled plasma mass spectrometry (ICP-MS).

The results show that Wenjiapo Jurassic coal is a low-volatile bituminous coal, medium-moisture, low-ash, low-sulphur. The contents of REY in Jurrassic coal with low sulfur are lower than those of Carboniferous and Permian coal from the Basin of North China. The high values of L/H and $(La/Yb)_N$ for the Wenjiapo No. 4 coals indicate that the coals are enriched in light REY and the REY distribution patterns for most of coal benches belong to L-REY type. The values of Eu/Eu* are more or less than 1 (with an average 1.002) and indicates that the Eu does not show special abnormal. δCe shows slightly negative anomaly with an average of 0.92, indicating the sedimentary environment of peat swamp is between the reduction and the weak oxidation. Although Jurassic coal in Huanglong is the low-ash with less than 15%, the REY abundances are still positively correlated with ash yield. The mineral matter in these coals is mainly consist of clay minerals, quartz, calcite, pyrite and dolomite. The REY are positively corrected with lithophile elements including Si, Al, Ti and Ti, which are mainly distribued in clay minerals, indicating that REY are containly mainly contained in clay minerals.