



Geochemical characteristics of illite clay rocks from Shihezi Formation in Zhangcun coal mining area, China

Yin.Chao. Yang

Hebei Jinniu Chemical Industry Co., Ltd, Cangzhou, Hebei 061000, China.

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Abstract

The geochemical characteristics of illite clay rocks from Shihezi Formation of Late Permian in Zhangcun coal mining area were studied by using ICP-MS and sequential X-ray fluorescence spectrometer. The results show that the SiO_2 content is 53.37-61.58 (wt)% and the Al_2O_3 content is 22.40-31.31(wt)%; The ratio of $\text{SiO}_2/\text{Al}_2\text{O}_3$ is 1.71-2.75. The contents of Fe and Ti are higher than their theoretical values in illite clay rock. Some trace elements including Ga, As, Ba, Cu, Th and U are higher than their Clark values and the other 23 trace elements detected are closed to their Clark values. The REE contents range from 22.59 to 570.54 $\mu\text{g/g}$ and the average content is 163.23 $\mu\text{g/g}$. The ratios of LREE/HREE range from 5.41 to 21.82, and the average value is 8.87. These characteristics show that LREE are much richer than HREE, and the REE distribution patterns of samples are characterized by obvious negative Ce anomaly and negative Eu anomaly.

Key words: Zhangcun coal mining area, Illite, Trace element, Late Permian

1. Introduction

In recent years, many researchers have done a lot of studies on geochemistry characteristics of coal measure strata (Yang *et al.*, 2008; Liu *et al.*, 2001; Dai *et al.*, 2003; Wu *et al.*, 2004; Yang *et al.*, 2004; Sun *et al.*, 2007), but the most focused on the geochemistry characteristics of coal seams (Dai *et al.*, 2002; Zhao *et al.*, 2009). In contrast, the geochemistry characteristics of associated clay minerals including kaolinite, smectite and illite were not paid much attention, especially geochemistry characteristics of illite

clay rocks were few reported (Liu *et al.*, 1997; Liu *et al.*, 1998; Ding *et al.*, 2008; Ding *et al.*, 2008). The purpose of this paper is to study geochemical characteristics of illite clay rocks and its significance, from Shihezi Formation of Late Permian in Hanxing minning area.

2. Samples and methods

2. 1. Samples

22 clay rocks samples, which include 7 samples from Lower Shihezi Formation and 15 samples from