The Isotopic Composition Of Selenium In Chinese Coals

JIAN-MING ZHU[1,2]*, THOMAS M. JOHNSON[2]*, LIANG LIANG[1] XIANG-LI WANG[2], HAI-BO QIN[1] AND ZUO-YING YIN[1]

[1]State Key Lab. of Environmental Geochemistry, Inst. of Geochemistry, CAS, Guiyang, 550002, China. (zhujianming@vip.gyig.ac.cn) (*present author)
[2]Department of Geology, University of Illinois at Urbana-Champaign, Urbana, 61801, USA.(tmjohnsn@illinois.edu)

Selenium generally occurs in relatively high abundance in coals, black shales and other organic-rich rocks. Coal mining, combustion and weathering are the important pollution source in China, which released a large of Se into the environment, increasing its concentration in the air, soils, water and plants, and in some areas of China, Se from coal combustion poses human health concerns. So comprehensive studies on Se isotopes in Chinese coals are very important to understand Se biogeochemical cycling and its geochemical behavior in surface environment[1].

Here, using HG (hydride generator)-MC-ICP-MS[2] and a ^{74}Se-^{77}Se double spike technique to achieve high precision, we determined Se isotopic compositions of Chinese coals from the different coal fields and geological ages. The $\delta^{82/76}$Se values ranged from -4.01‰ to 4.75‰ in our samples already analyzed. The overall range of $\delta^{82/76}$Se was 8.76‰, indicating Se isotopic variation occurs in a relatively moderate range compared to most shales. Systematic differences in Se isotopic composition between high sulfur and low sulfur(Total S<1%) Chinese coals were not observed.

However, the Se isotopic composition of coals from different geological ages are different. The average $\delta^{82/76}$Se values of Chinese coals formed in Tertiary, Jurassic-Triassic, and Permian-Carboniferous Period are 2.10±0.74‰, -0.07±0.68‰, and 1.50±0.25‰, respectively. The difference in $\delta^{82/76}$Se values may be related to their original precursor plant speices, or further reflect the paleoclimate change, continent weathering situation and depositional plaeoenvironment. Additionally, our results also provide some hope that Se isotopes may be used to trace atmospheric Se sources in the different regions of China.

The work was supported by the National Natural Science Foundation of China (41073017, 41021062) and the Knowledge Innovation Program of the Chinese Academy of Sciences (KZCX2-YW-JC101).

[1] Johnson (2004) *Chem Geol* 201-214. [2]Zhu *et al*. (2008) *Chinese J Anal Chem* 36, 1385-1390.

Geochemistry of Huashan A-Type Granitoid Complex, South China, and its geotectonic significance

ZHU JINCHU

Department of Earth Sciences, Nanjing University, Nanjing 210093, CHINA (jczhu@nju.edu.cn)

The Huashan A-type granitoid complex in NE Guangxi Province, South China, with an exposure of more than 500 km^2 in area consists of three granitoid bodies: The Huashan main body biotite granite batholith, the Niumiao diorite stock in the SE periphery, and the Tong'an quartz monzonite granite stock in the W periphery. This complex is 160~163 Ma in emplacement age, acidic to intermediate in composition. The mafic enclaves with mingling feature are frequently seen. This complex is characterized by high contents of alkalis (especially K) and enrichment in LILE (Rb, K, Ba, Pb, etc.) and HFSE (Th, U, REE, Y, Nb, Ta, Zr, Hf etc.). The whole rock I_{Sr} values are between 0.70472 ~ 0.70714, εNd(t) values between -0.37 ~ -3.21, and $\varepsilon Hf(t)$ values of zircons between -2.8 ~ +2.1. These geochemical data indicate an A type feature and significant involvement of mantle materials. Combining the regional geological and geochemical data, we suggest that strong mixing of mantle-derived and crust-derived magmas under an intense crustal extension and thinning environment during the Mid-Late Jurassic period might be the major mechanism for generating the A-type Huashan granitoid complex.

DOI:10.1180/minmag.2013.077.5.26