Geochemistry and petrogenesis of the Carboniferous-Permian granitic magmatism in Tianshan, Northwestern China

XUE-YI XU[1], HONG-LIANG WANG[1,2], PING LI[1], JUN-LU CHEN[1] AND WANG NING[1]

[1]Xi'an Center of Geological Survey (Xi'an Institute of Geology and Mineral Resource), CGS, Xi'an, Shanxi 710054, China

[2]State Key Laboratory of Continental Dynamics, Department of Geology, Northwest University, Xi'an, Shanxi 710069, China)

The Carboniferous-Permian grantic magmatism developed strongly in Tianshan orogenic belt , which are composed of various rock types in diversified geodynamic settings. It not only concludes diorite, monzogranite, tonalite, plagiogranite of calc-alkaline series, but also syenite, quartz syenite, albitophyre of alkaline series. Via comparison of petrogenesis, geochemistry, and magma- processes of granitic rocks , the granitic rocks related to different tectonic units can show that the granitic rocks formed during the period of Carboniferous-Permian are mainly calc-alkali series. The Carboniferous-Permian granitic rocks developed in Eastern Tianshan and Bogda rift zone, containing more MgO, TiO_2, Na_2O and less K_2O, Nb, and Th than the granitic rocks developed in ancient micro-terrain and its edge, means a different source. The granitic rocks in the rift zone formed by the mixing processes of the crust and mantle, containing different degrees of crust-derived components, usually are closely related to intermediate-acid volcanics. However, the granitic rocks developed in ancient micro-terraint mainly show strong information about crust source. The chemical composition of granitic rocks formed in the same tectonic settings but developed in different regions also is different. For example, the Tomor Peak granitic rocks developed in Western Tianshan, and the Kuruktag granitic rocks developed in the south of Central and Eastern Tianshan are all formed by crust source. But the former rocks possesses more Mg, K, Nb, Sr and less Zr, Ba than the latter. This shows some differences of crustal components added in Eastern Tianshan and western sections. Moreover, the positive εNd value of granitic rocks developed in the study region may be caused by partially melting of mantle-derived volcanic rocks.

This study was supported by the National Natural Science Foundation of China (Grant No. 40872061)

Geochemical characteristic contrast of heavy metals between sulphide mines and oxide mines

ZHENGQI XU[1,2,*], SHIJUN NI[2], YANGUO TENG[1] AND CHENGJIANG ZHANG[2]

[1]College of Water Science, Beijing Normal University, Beijing, 100875, China (*correspondence: xuzhengq@163.com)

[2]Department of Geochemistry and Nuclear Resource Engineering, Chengdu University of Technology, Chengdu, 610059, China

Sulphide mines have always been the concerns of people because of their various forms and the resultant environmental problems, whereas oxide mines are paid less attention and not studied much because they do not cause obvious environmental problems. However, the potential environmental problems caused by oxide mines can not be ignored. The author chooses Panzhihua V-Ti-Magnetite, a famous oxide mine in China, as the subject of research. The geochemical characteristics of heavy metals in various environmental media (such as water, soil, and atmosphere) during the process of mining are systematically studied by using the above media as research carriers and employing the analyzing methods of ICP-MS and ICP-AES.

The results show that the geochemical characteristics of heavy metals in the sulphide mines and oxide mines have both similarity and difference. The biggest differences are: the content of chalcophile elements in environmental media of sulphide mines is far higher than that in oxide mines; the worst pollution of oxide mines is caused by atmosphere dust and heavy metals, while the worst pollution of sulphide mines is caused by acid mine drainage. The similarity between the two mines is that their morphological features are same.

Moreover, compared with the sulphide mines, the geochemical characteristics of the oxide mines are: it is mainly polluted through atmosphere circulation; its primary pollution medium is lithometeor; its most remarkable environmental problem is heavy metal pollution and geologic disasters. The oxide mine has potential geochemical hazards, which always break out with change of physical and chemical conditions.