

Stale isotope characteristics of iron ore deposits in the western Tianshan Mountain, NW China

ZHANG ZUOHENG¹, DUAN SHIGANG², JIANG ZONGSHENG³

¹ Institute of Mineral Resources, CAGS, Beijing 100037, China, zuoheng@hotmail.com

² Institute of Mineral Resources, CAGS, Beijing 100037, China, dsq1102231@163.com

³ Institute of Mineral Resources, CAGS, Beijing 100037, China, jzongsheng@126.com

Several medium-large scale iron ore deposits were gradually discovered in Chinese Western Tianshan Mountain. In this study, we carried out some oxygen and sulphur isotope analysis on these iron deposit.

1. Oxygen isotope

Oxygen analysis were taken for magnetites from Cha gangnuoer, Zhibo and Beizhan iron deposits respectively. Five massive and breccia ores generated during the magmatic phase and mineralized andesite show the $\delta^{18}\text{O}_{\text{V-SMOW}}$ value of magnetites ranging from 0.6 ‰ to 5.5‰, with an average of 3.8‰. Five magnetites of magmatic stage have that value changing between 1.8‰ and 3.5 ‰, with an average of 2.4 ‰. The value of magnetite of nine ore samples from Beizhan iron deposit are between 0.6 ‰ and 4.6‰, which closing that value distributing within orthomagmatic rocks, and they are similar as that value presented in the magmatic water.

2. Sulphur isotope

The $\delta^{34}\text{S}$ value of hydrothermal are 1‰ ~ 4‰ in Beizhan, 6‰~8‰ in Dunde, -2‰~0‰ in Zhibo, 5‰~7‰ in Chagangnuoer, 0‰~ 1‰ in Wuling, -3 ‰~2‰ in Songhu and -1‰ in Akesayi deposit. Obvious variations of $\delta^{34}\text{S}$ value show that the oxygen fugacity is close or slightly higher than that of $\text{SO}_2/\text{H}_2\text{S}$ boundary. Considering that, we consider that the sulphur source of these iron deposits may come from magma, which also corresponds to the close geological relationship between these iron deposits and the volcanic and intrusive rocks in this region.

Stable isotope characteristics of these iron deposits show that ore forming material are derived from deep magma.

Acknowledgments

This work was jointly supported by the National Basic Research Program in China (2012CB416803), National Science and Technology Support Program in China (2011BAB06B02-05).