Sulfur isotope constraint on the Chipu Zn-Pb deposit

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Result

Chipu large scale Zn-Pb deposit is located on the southwest margin of Yangtze craton, China. It is one of the most important deposits in this area. The sulfur isotope is measured on sphalerite and galena. Ores are enriched in heavy sulfur. The ranges of $\delta^{34}S$ for the samples of shpalerite and galena are from 8.6‰ to 13.2‰ and 11.9‰ to 15.1‰ with an average of 10.71‰ and 13.23‰, respectively. Our results are shown in the figure below.

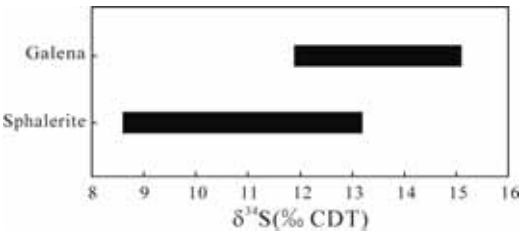

Figure 1: Distribution of $\delta^{34}S$ from Chipu deposit.

Discussion of Results

The characteristic of enriched in heavy sulfur is obviously different from mantle-derived sulfur with $\delta^{34}S$ values of about 0 per mil. However it is similar to those of about 17 per mil for the host rock of Dengying Fmantion. The sulfur in the ore-forming fluids of this deposit came mainly from the carbonate strata. Reduced sulfur can be derived from the thermochemical reduction of sulfate (TSR) by organic matter, which yields sulfur isotope fractionations less than about 0 to 15 per mil of the isotopic value of the sulfate source [1]. The homogenous temperatures of fuild inclusion in shalerite are from 127 to 288°C [2], which are sufficient to overcome the kinetic constraints of accounting for sufficient production reduced sulfur locally within the ore deposit. In addition, there are many bitumen in or near the orebody. So we propose that Chipu Zn-Pb deposit is interpreted to have involved reduced sulfur derived by TSR. This will be a important evidence for researching on the genesis of this deposit.

[1] Leach *et al*. (2005) *Economic Geology* 100th Anniversary Volume, 561~607. [2] Zhang *et al.* (2007) *Acta Petrologica Sinica* **23**, 2541-2552.

Framework of Mesozoic magmatism and crust-mantle interaction in the Dabie Mountain and middle-lower Yangtze River belt, central China

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Integrated methods including *in situ* zircon dating, petrology and geochemistry have been taken to investigate the massive magmatism in the Dabie Mountain and adjacent areas, which gain the result that Mesozoic magmatism began from late Jurassic and reached its peak at early Cretaceous. Zircon LA-ICP MS age of Zhangbang pluton, a small scale granitic pluton in southern Dabie Mountain, is 150.3±2.0 Ma, which is at present the earliest Mesozoic magmatic record and approximately 20 million years prior to the peak. *In situ* zircon Hf analyses performed on LA-MC-ICP MS obtain $\varepsilon_{Hf}(t)$ values of about -29 and Hf crustal model ages of around 3.05 Ga. These greatly old model ages are similar to ages of the continental core of the South China Craton and the basement rocks of the Dabie Mountain, which suggests its magmatic protolith is mainly earlier Precambrian metamorphic complex. Statistic analyses of accurate chronological and geochemical data of igneous rocks show that the magmatic movement and crust-mantle interacton in the Dabie Mountain and the middle-lower Yangtze River belt occurred almost simultaneously with a rough duraiton from 150 Ma to 115 Ma. The thickening of the orogenic crust started after ~ 150 Ma and finished at ~ 130 Ma, and was followed by the striking thinning and collapse. However, there are some significant differences in magmatic composition and magmagenesis between Dabie Mountain and middle-lower Yangtze River belt, including $\varepsilon_{Nd}(t)$ values which are usually between -10 and -25 in the former while not less than -10 in the latter, suggesting a model that mantle-derived magma played a more important part in the latter than that in the former. An implication could be drawn that the extents of upwelling of asthenosphere and delamination of lithosphere in late Mesozoic were much more intense in the middle-lower Yangtze River belt than those in the Dabie Mountain.

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