Sulfur isotopic geochemistry of the Woxi W-Sb-Au deposit, South China: Implications for ore genesis

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Introduction

The Proterozoic turbidite-hosted W-Sb-Au mineralization at Woxi, South China occurs predominantly as stratiform ore layers and subordinately as stockwork veinlets subvertical to the overlying stratiform ores. Based on studies of ore textures and REE geochemistry, Gu et al. (2002) suggested a synsedimentary exhalative (sedex) origin for the Woxi deposit. Sulfur isotopic data of this study further support a syngenetic model.

Results and discussion

The _^{34}S value of a barite sample (13.1 ‰) from the host metasedimentary rock is close to contemporaneous (late Proterozoic) seawater sulfate (~ 15 ‰), simply suggesting a dominant seawater sulfate source. The _^{34}S values of pyrite from the ore range from –7.4 to –6.2 ‰, consistent with the _^{34}S values of pyrite in the host rock (–10.6 to –5.5 ‰, averaged at –7.2 ‰) but approximately 4~5 ‰ lower than the _^{34}S values of stibnite (–2.1 ± 0.4 ‰) in the ore. These data may be explained using a seawater-rock interaction model, whereby the ore-forming fluids (i.e., evolved seawater) acquired sulfide-sulfur through (a) dissolution of sulfide-sulfur in the footwall-rock sequences, and/or (b) partial reduction of seawater sulfate. The total range of sulfide _^{34}S values is similar to the range observed in marine sediment-hosted massive sulfide deposits but much larger than the range documented in volcanogenic massive sulfide deposits where the variation in the sulfide _^{34}S values within each ore deposit is usually less than 3 per mil (Ohmoto, 1986), suggesting presence of both biogenic sulfide-sulfur and hydrothermal sulfide-sulfur in these deposits.

Conclusions

Sulfur isotopic geochemistry provides strong evidence for a synsedimentay exhalative model for the Woxi deposit whereby the stratiform ores formed from metalliferous basinal brines episodically released along diffuse feeder zones.

References

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Geochemical characteristics of mantle source region of lamprophyres in Baimazhai nickel deposit, Yunnan province

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The evidence from major element show that the lamprophyres in Baimazhai nickel deposit are potassic and potassium-rich calc-alkaline ones The pattern of trace element is similar hump type and REE is similarly LREE-rich type. Compared to MORB, they are characterized by enrichment in LILE and HFSE. we have modeled the composition of the mantle source region with petrological mixing calculation, and the result is referred in fig.1, Both elemental geochemistry and mixing calculation show that lamprophyres in Baimazhai nickel deposit derived from metasomatism enriched mantle. considering that the tectonic evolutionary history in western Yunnan province,we concluded that the fluid resulted from dehydration of subducted slab which comprises of ALK, LREE and incompatible–rich seafloor sediments is the main factor causing metasomatism..

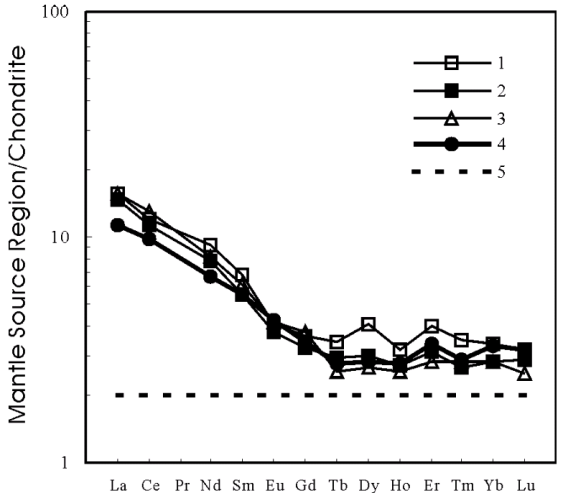

Fig 1 The REE distribution patterns of the source region of lamprophyres in Baimazhai nickel deposit

References:

Huang Zhilong, et al, 1999. Origin of lamprophyres in Laowangzhai gold deposit, Yunnan province and their relation with gold mineralization. Beijing: Geological publishing house (in Chinese with English abstract).