REE geochemistry of calcites and stibnites from Banian antimony deposit

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Banian antimony deposit is located in the southeastern area of Dushan County, Guizhou province, China, and has been one of the important parts of the Dushan antimony ore field. The ores are very simple in composition; calcite is the predominant gangue mineral in the deposit. It can be classified into two types of pink and white, and it is identified that the formation sequence between these major minerals is white calcite → pink calcite → stibnite.

The REE characteristics of those calcites, stibnites and wall rocks are significantly different from each other. Among them both types of calcites contain relatively high total REE abundances, showing a significant REE fractionation with strong MREE- and HREE-enriched and LREE-depleted, even with La and some other elements are below detection limits. In detail, the remanent pink calcites have higher REE abundances than the white ones. Especially the LREE abundances of pink calcites are apparently higher than the white calcites. And the LREE/HREE ratios of pink calcites are also clearly higher than white calcites. The REE patterns described above show the tendency of an increase in the LREE concentration while the concentration of HREE remains nearly constant. Contrary to calcites which have strongly LREE-depleted patterns, all stibnite samples show strongly LREE-enriched patterns with extremely high LREE/HREE ratio. Except for La element with incredible high content, abundances of other REE fall off steeply as atomic number increases (and ionic radius decreases) and, as a result, individual values of MREE and HREE for most samples are better than the detection limits. Almost all of stibnites contain Y element below the detection limit, which is also contrary to the calcites.The total REE abundances of wall rocks, no matter near-ore or distal, are higher in comparison to calcites or stbnites. Their patterns show moderate LREE-enriched Wright-wing-type, with moderate Eu anomaly.

Compared to the LREE-enriched calcites from the Wanshan and Lae mercury deposit, it is found that the Fe and Mn contents in MREE- and HREE-enriched calcites from Banian are apparently higher. We suggest that the Fe-Mn impurities in calcite may play an important role on the enrichment of MREE and HREE in calcites from Banian.