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Sulfur isotopic compositions of stibnite in antimony deposits, southern Myanmar

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Antimony (Sb) deposits are generally formed by precipitation from metamorphic (diagenetic) or hydrothermal fluids and can be accompanied by Au or W in some deposits. In southern Myanmar, many Sb deposits are distributed north and south although the ore genesis is not studied well. In this study, we discuss sulfur isotopic compositions of stibnite (Sb_2S_3) and Sb(-Au) mineralization of some Sb deposits.

The Sb deposits are hosted by the Carboniferous to Early Permian Mergui and Lebyin Groups consisting mainly of mudstone, sandstone and limestone, consisting of stibnite-quartz vein-type and disseminated ore bodies. It is not well understood whether the ore bodies were formed from metamorphic fluids or fluids which are contributed from magmatic hydrothermal components. Granitic rocks (both magnetite-series and ilmenite-series), which could be the heat source of the hydrothermal fluids, are regionally distributed in the Sb metallogenic province although volcanic rocks are rarely found. The Sb ores consist mainly of stibnite and quartz, and occurrences of other minerals are uncommon. Stibnite occurs as euhedral elongated crystals and coexists with massive milky quartz. Fine-grained pyrite crystals are found in stibnite and quartz under a microscope. In one of the samples, stibnite is rimed by an alteration mineral, cervantite (Sb_2O_4).

Sulfur isotope ratios (δ^{34}S) of stibnite range widely from -9.4 to +8.2 ‰. The light isotope ratios ($\delta^{34}S < 0$ ‰) are interpreted probably from sulfur of sedimentary host rocks, whereas the heavy isotope ratios ($\delta^{34}S > 0$ ‰) are attributed to result from contributions from high-temperature or oxidized hydrothermal fluids. Magnetite-series granitoids generally show heavier sulfur isotope ratios than ilmenite-series, however no significant relationship was found between the isotope ratios and distribution of granitoids.

Stibnite is accompanied by Au mineralization and Au is recovered in some of the Sb deposits. Results of fire assay show that these Sb ores contain 0.1 to 3 ppm Au, approximately. The Au-bearing stibnite samples show positive sulfur isotope ratios.

Keywords: antimony, stibnite, sulfur isotope, deposits, gold, Myanmar