GEOCHEMICAL CONSTRAINTS ON THE GENESIS OF THE XIKUANGSHAN SUPERGIANT STIBNITE DEPOSIT IN HUNAN PROVINCE , CHINA

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The Xikuangshan supergiant stibnite deoposit in Hunan province, China, is the largest antimony deposit in the world. Its genesis has been debated for a long time. There are two major genetic models:one holds that the supergiant Sb ore deposits is the product of magmatic activities, whereas another model considers host rocks as the source rock. These two concepts are inconsistent with the factual geological and geochemical charactersitics of the Xikuangshan deposit (absence of large granitic pluton in the ore field , generally very low antimony content in certain formations and the isotopic data). Our recent geochemical studies on the Xikuangshan deposit: 1) the thermometry of gangue minerals; 2) fairly detailed d18O, dD measurements made on the quartz, calcite and their inclusions; 3) researches on silicon isotopic compositions of quartz, host rocks and lamprophyre show that: a) it is of meso-epithermal origin(100 - 300°C), b) the d18O values of ore-forming fluids are characteristic of wide range and a d18O-shift phenomenon, indicating a large-scale 18O exchange between ore-forming fluids and host rock(limestone); c) the silicon source of the silicified rocks and quartz are not from neither its host rock nor the lamprophyre, but are from the basement. So we propose a new genetic model suggesting the supergiant Sb mineralization was genetically related to Mesozoic subaerial fossil hydrothermal system. The large-scale convection of underground water leached out and transported valuable metals such as Sb from source rocks and/or pre-exist ore deposits, and the focussed discharge along the fault zones contributed to the formation of the supergiant Sb deposit under the appropriate sedimentary barrier.