Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02953, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02953
EGU General Assembly 2008

Identification of superimposition of exhalative sedimentary and magmatic hydrothermal mineralization of Sn in the Da Hinggan Mountains, China

C. Wang (1,2,3) , Q. Cheng (1,3), S. Zhang (1), J. Deng(1), S. Xie (3)

(1) State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Beijing, China, 100083. (2) Key Laboratory of Lithosphere Tectonics and Lithoprobing Technology of Ministry of Education, China University of Geosciences, Beijing, China, 100083. (3) Department of Earth and Space Science and Engineering, York University, 4700 Keele St., Toronto, ON, M3J 1P3, Canada (wcm233@163.com)

Over the past three decades, exploration activities in the Dajing mineral district Inner Mongolia, China, have being mainly focused on Sn polymetallic deposit related to epigenetic magmatic hydrothermal systems associated with Mesozoic magmatism. This research has found geological and geochemical evidences indicating that subaqueous exhalative mineralization might have occurred during the basin evolution in Permian period, and subsequently magmatic mineralization is superimposed which has enhanced the Sn mineralization.

The siderite-sericite chert newly found in the Dajing Sn deposit indicates a new type of exhalites formed in a basin and closely associated with complex metal assemblage of Sn-Ag-Cu-Pb-Zn of sulfide ores. Exhalative sedimentary textures and structures observed at the siderite-sericite chart such as small-scaled folding or weak-deformation of the bedded-laminated exhalite, with lamination and synsedimentary brecciation indicate exhalative genesis of the chart. In addition, the siderite-sericite chert and Sn ore bodies are stratiform with siltstone and slate of Linxi Formation, which have been intruded by the Jurassic-Cretaceous volcanic-plutonic rocks.

Hydrogen and oxygen isotope compositions of the fluid inclusions in quartz vein of

different stages showed that the ore-forming fluids may mainly originate from magmatic fluid with a minor mixture of meteoric water. Model ages of lead isotopes of the ores can be divided into two groups: the first group ranging from 200Ma to 300 Ma, may represent volcano-sedimentary mineralization in the Variscan epoch, while the second group ranging from 118Ma to 190 Ma represents the superimposed mineralization in the Yanshanian epoch. Calcite with $\delta^{13}C_{PDB}$ from -1.8 ‰ to -8.4 ‰ and $\delta^{18}O_{SMOW}$ from 7.1‰ to 12.7 ‰ in the ores and hydrothermal sedimentary rocks were comparable overall with many SEDEX-type sulfide ores and their associated exhalites, implying a similar genesis for these deposits.

These comprehensive evidences have come to a conclusion that the mineralization processes resulted in Dajing Sn polymetallic deposit could have gone through two stages: in the first stage, sedimentary mineralization occurred during the Permian period; in the second stage, the Yanshanian magmatic hydrothermal mineralization had happened and superimposed to the early mineralization. This new proposition is useful not only for interpretation of the genesis of the Dajing large Sn deposit but also significant for mineral exploration in the area especially for finding large deposits caused by superposition of multiple mineralization processes.