Mineralogy, fluid inclusions and geochemistry of Sb vein-type mineralizations of the Berga Anticline, Eastern Thuringia, Germany

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The antimoniferous vein-mineralizations in the Schleiz and Greiz area, eastern Thuringia, are bound to NE-SW striking Variscan faults zones along the margins of the Berga anticline. The Sb(-Au, Ag)-ores form massive sulfide-sulfosalt-quartz±carbonate veins, breccias or stockworks hosted by Ordovician and Silurian metasedimentary units, Devonian metabasalts and metagranitoids.

Mineralogical investigations of 52 ore samples from various mines and quarries near Greiz and Schleiz (eastern Thuringia) show that Sb-Pb-Zn-sulfides occur texturally in close association with quartz and Ca-Fe-carbonates. This Sb-rich assemblage replaces older Zn-Fe-As-Cu-sulfides. Stibnite is the major Sb-bearing mineral in all investigated samples. However, Pb-dominated Sb-sulfides such as zinkenite, plagionite, semseyite and boulangerite are also present showing a distinct metal zonation.

Microthermometric results of primary fluid inclusions hosted by quartz and stibnite show low-salinity H_2O-CO_2-NaCl fluids with T_h(total) = ~220 °C, in contrast to primary fluid inclusions related to semseyite and boulangerite that reveal significantly lower homogenisation temperatures of T_h(total) = 145 °C and slightly higher salinities of eq.w (NaCl) up to 7.9 %.

Prelimininary geochemical results (wet chemical digestions + ICP-MS) show that the 19 analyzed antimony concentrates contain Au concentrations in the range of 100 ppb – 590 ppb (average 190 ppb), Ag contents from 0.3 – 71 ppm (average 7 ppm) and Hg from 0.1 – 100 ppm (average 27 ppm). Gold concentrations above 300 ppb are invariably associated with the Pb-poor Sb-sulfides (Pb+Zn < 350 ppm), while the highest Ag content of stibnite is associated with higher Pb+Zn (5000 ppm) values. However, Ag concentrations typically scatter around 2 ppm for most analyses.

In order to improve the understanding of the ore-forming processes and nature of the fluids, stable and radiogenic isotope studies are planned to be carried out.