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The Sb-Au-district Brandholz/Goldkronach (Fichtelgebirge, Germany): mineralogical indications for the evolution of hydrothermal Sb-mineralization.

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The Brandholz/Goldkronach district is situated in the southeastern part of Germany in the Bavarian Fichtelgebirge. Previous literature of the mineralogy of the district is rather descriptive and modern geochemical analysis are entirely missing. In this contribution, we combine petrography, bulk rock-geochemical analysis, SEM-MLA as well as EPMA to infer on precipitation mechanism and ore-forming processes. The quartz-polymetallic-sulfide veins are hosted in Ordovician shists, called “Phycodenschiefer”, which were intruded by upper Devonian meta-basalts. Antimony-sulfides are the main ore mineralization inside of the quartz-veins, accompanied by minor auriferous arsenopyrite and pyrite. Petrographic observations suggest a precipitation of an early stibnite phase (stage I). Sb-Pb-sulfides/sulfosalts (stage II) precipitated in fractures and fissures of stage I stibnite with a slightly change to Pb-rich Sb-phases. The antimony-mineralization event evolved from stibnite (Sb_2S_3), over fülöppite ($Pb_3Sb_8S_{15}$), zinkenite ($Pb_9Sb_{22}S_{42}$), plagionite ($Pb_5Sb_8S_{17}$) to boulangerite ($Pb_5Sb_4S_{11}$). Chemical analyses corroborate the petrographic observations and indicate a change in the hydrothermal environment from a Sb- to Sb-Pb dominated system with a distinct geochemical change from Pb-free to Pb-containing Sb-phases. A characterization of the precipitation sequence can be used to improve the understanding of the hydrothermal evolution of the whole Sb-Au-ore system in Goldkronach.