CONTRASTING RARE METAL POTENTIALS IN TWO SOUTHERN ALPINE VEIN DEPOSITS

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Investigating rare metal potentials of the Alpine regions is of great importance to progress towards future supply independence. Sphalerite is an important carrier of Co, In, Ga, Ge, and Sb, and we know from the Eastern Alps, that vein deposits roughly host 66 % of the Co, 18 % of the Ga and 4 % of the In resources (MELCHER & ONUK, 2019). Here, we present data of sphalerite (and chalcopyrite) from two contrasting vein deposits in the Southern Alpine basement: the Pfunderer Berg Cu-Zn-Pb-Ag mine near Klausen and the Rabenstein F-Zn mine in the Sarn Valley. Both abandoned mines used to be important pre-industrial, and to some extent post-industrial metal or fluor suppliers.

The Pfunderer Berg mine is a Permian intrusion-hosted vein deposit with a chalcopyrite-sphalerite-galena-sulphosalt paragenesis (KRISMER et al., 2011). The Rabenstein mine is a vein deposit with fluorite-sphalerite paragenesis, probably related to the Periadriatic fault (HEIN et al., 1990).

The two ores show contrasting textures and chemistry of sphalerite, which are primarily related to formation temperature: at Pfunderer Berg high-T ZnS is black and homogeneous and enriched in Fe-Mn-Cd-Cu-Se-Co-In-Sn, while at Rabenstein low-T ZnS is honey-coloured and zoned and enriched in Pb-As-Ag-Sb-Hg-Tl-Ga-Ge. Rare metal medians at Pfunderer Berg are 303, 124, and 187 µg/g for Co, In, and Sn. At Rabenstein medians for Ga, Sb, Ag, and Ge are 383, 203, 85, and 9.1 µg/g. Spot analyses can reach higher values, either related to mineral inclusions (Pfunderer Berg) or to zoning (Rabenstein). Across zoned ZnS grains, co-variations with Fe-content (0.3 to 6 wt.%) or Cu (70 to 5000 µg/g) are related to an evolving hydrothermal pulse. Results demonstrate significant rare metal variations across deposit types, but also complexities of fractionation within given deposits.

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