

Ge-enriched chalcopyrite from the Cu-Ag Kupferschiefer deposit in Poland

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The world-class Cu-Ag Kupferschiefer mineralization from the southern margin of the Upper Zechstein basin in Poland provides numerous by-products including Pb, Zn, Au, Ni, Pt, Pd and Re.

Late sulphide-carbonate veins, mm to tens of cm thick, crosscutting the shale and dolostone, are present in the Sieroszowice-Polkowice and Rudna mines. The ore assemblage consists of massive chalcopyrite and minor bornite, galena and sphalerite. Samples have been analysed with the laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). For sphalerite analyses, the matrix-matched sintered pressed powder pellet reference material MUL-ZnS 1 [1] was used for quantification of the element content and the USGS powder pressed polysulfide reference material MASS-1 was used for quality control. In the case of chalcopyrite, MASS-1 and NIST-612 glass were used respectively.

Results demonstrate that chalcopyrite locally contains anomalously high concentration of germanium (11.4-2372 µg/g, median=1102 µg/g) while sphalerite crosscutting chalcopyrite has low germanium content (0.55-3.5 µg/g). GGIMF is geothermometer [2] has been applied to sphalerite and gave values in the range of 78-150°C. Similar, Ge-enriched chalcopyrite, has been reported in the Barrigão re-mobilized vein deposit in Portugal, where EMPA analyses show 0.19 wt.% of Ge in chalcopyrite on average [3].

The anomalous content of Ge in chalcopyrite is most likely a consequence of late re-mobilization process related to the small faults crosscutting the ore mineralization and filled by sulphide-carbonate veins. This results indicate a need for re-investigation of the germanium occurrence in the deposit.

[1] Onuk et al. (2017) *Geostand Geoanal Res* **41**, 263-272. [2] Frenzel et al. (2016) *Ore Geol Rev* **76**, 52-78. [3] Reiser et al. (2011) *Int Geol Rev* **53**, 1212-1238.