

Ore mineral paragenesis of the Au-Ag-Pb-Zn epithermal mineralisation around Parádfürdő, Recsk Ore Complex (NE-Hungary)

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The intermediate sulphidation type, Au-Ag-Pb-Zn epithermal mineralisation around Parádfürdő is a part of the shallow epithermal mineralisation of the Paleogene Recsk Ore Complex. The studied mineralisation is located above the mineralised diorite intrusion and hosted by altered dacite and dacitic tuff units (MOLNÁR, 2007). The ore mineralisation is controlled by siliceous veins and hydrothermal breccia dykes (MOLNÁR, 2007). The ore formation generally started with the precipitation of pyrite. However, in some samples, these pyrite crystals contain xenomorph bornite, tetradymite, Au-Ag-tellurides (calaverite, hessite) and aikinite inclusions. The presence of aikinite has not been known before this study (KISVARSÁNYI, 1954; NAGY, 1983). Two different pyrite textures were observable in the samples: the euhedral pyrite crystals with the above mentioned mineral inclusions and a collomorph pyrite-marcasite intergrowth. The observed pyrite-marcasite assemblage indicates the pH-oscillation of the ore-forming fluidum at the early stage of the mineralisation (MUROWCHICK & BARNES, 1986). Thereafter the mineralisation continued with the precipitation of galena and sphalerite. The galena crystals usually form xenomorph grains surrounded by a layered reaction rim. The presence of the following minerals was proven within this layered rim by Raman spectroscopy: phosgenite, covellite, cerussite and anglesite. The sphalerite crystals are also xenomorph and always surrounded by chalcopyrite, where the sphalerite bordered with a latter fahlore. Within bigger sphalerite grains, small chalcopyrite inclusions often appear in great amount. This chalcopyrite probably was formed as a reaction product, when the FeS content of the

sphalerite reacted with this later Cu-rich fluidum at the final stage (BORTNIKOV et al., 1991), which produced the late fahlore mineralisation. During this late ore formation stage, tetrahedrite and tennantite were formed. The main copper substitutions in fahlores are Fe, Zn, but a small amount of Ag, Mn also occurs. Fluid inclusion studies were performed on primary fluid inclusions of quartz crystals, which are always related to the ore minerals. The different liquid/vapour ratio in the fluid inclusions at room temperature indicate heterogenous capturing, which suggests boiling of fluids during the crystal precipitation (ROEDDER, 1984). The measured homogenisation temperatures of the aqueous liquid rich inclusions range between 160-400°C. The salinity of the inclusions was calculated in the NaCl-H₂O system, and range between 0.5 and 5 NaCl equiv. wt%. The presence of the following gases was proven by Raman spectroscopy in the vapour phase of the inclusions: H₂O, H₂S, CO₂ and CH₄.

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