PHOSPHATE-BEARING MINERALS IN EPITHERMAL SYSTEMS – A FEW EXAMPLES FROM THE CARPATHIAN-PANNONIAN REGION

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Sulphate minerals have a significant role in the alteration zones of epithermal systems, as sulphate-containing solutions of different origin are present in both HS and LS systems. The most typical sulphate mineral in these systems is alunite.

It is not widely known that during these processes phosphate-bearing minerals are also formed - though in a less amount. The phosphate-bearing minerals in the alteration zones of epithermal mineralizations appear in a wide range of genetic environment, from hydrothermal to supergene processes.

While the sulphur is abundant in the hydrothermal solutions of epithermal systems, the phosphor is subordinate. Thus, the main source of phosphor can be the apatite of magmatic rocks, which is dissolved in strongly acidic fluids at high temperature (STOFFREGEN & ALPERS, 1987).

An early-formed mineral is the woodhouseite (aluminium-phosphate-sulphate or APS mineral), which is isostructural with alunite. Two new occurrences of woodhouseite were found in the Carpathian–Pannonian region (BAJNÓCZI *et al.*, 2003). One of these occurrences is at the eastern part of the Velence Mountains (Hungary), in the quartz-alunite zone of the HS system related to Paleogene volcanites. The other occurrence is at Podpolom, Javorie Mountains (Slovakia), in the siliceous breccias of the HS system, which is developed in a Neogene volcanic complex. In both areas the woodhouseite occurs in the core of the magmatic-hydrothermal alunite or in the siliceous matrix, which means that it was formed prior to alunite. Beside woodhouseite, two other phosphate minerals, augelite and crandallite were also found.

Near Legyesbénye, Tokaj Mountains, Hungary, alunite appears in strongly silicified rocks, filling fissures and closed vugs. Electron microprobe studies proved the enrichment of Pb, Al, and P in the core of the alunite crystals (SZAKÁLL *et al.*, 1986). The elongated forms of minerals suggest that the alunites are pseudomorphs of apatite. The chemical composition indicates a transition for hinsdalite (a mineral in relation with woodhouseite). It seems that the formation of the APS minerals took place before the crystallization of alunite.

However, we suppose that the APS minerals occurring along the opened fractures in spherical or radial, needle-like clusters are of supergene origin. These are crandallite (Podpolom, Slovakia and Recsk-Parádfürdő, Hungary), wavellite, faustite and variscite (Parádfürdő) and plumbogummite (Pátka and Nadap, Hungary). In association with these minerals jarosite and clay minerals are common.

References

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