

KOLBECKITE FROM BIXAD, ROMANIA: THE FIRST AUTHENTIC OCCURRENCE IN THE CARPATHIANS

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Kolbeckite is a rare hydrous scandium phosphate ($\text{ScPO}_4 \cdot 2\text{H}_2\text{O}$) of about 20 occurrences worldwide. Kolbeckite is not mentioned[#] for the Carpathians in the most recent reference work of the Carpathian minerals (SZAKÁLL, 2002). Here we describe the first authentic kolbeckite occurrence from the Carpathian region.

The South Harghita Mountains represent the southernmost part of the Călimani-Gurghiu-Harghita Neogene eruptive chain. Shoshonitic rocks occur in two isolated eruptive bodies in the southernmost part of the Harghita Mountains (SEGHEDI *et al.*, 1987). Kolbeckite was found, extreme rarely, on plagioclase crystals in miarolitic cavities of shoshonite in a quarry at Bixad (Sepsibükszád). The most abundant mineral of these cavities is intermediate plagioclase, forming colourless, stubby prismatic crystals up to 1 mm in length, covering the walls of cavities in close arrangement. Beside plagioclase, well developed diopside, quartz and titanite crystals, up to 0.5 mm in size, can be observed, too. Kolbeckite is present in the surroundings of zircon-containing, anorthite- and diopside-dominant xenoliths.

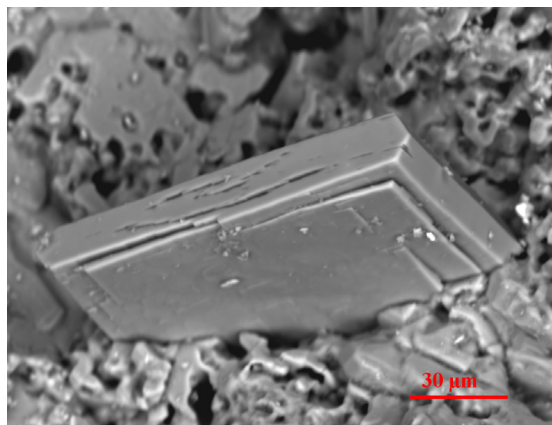


Fig. 1. Tabular kolbeckite crystal.
SEM SE photo.

Kolbeckite forms colourless, pseudo-orthorhombic tabular single crystals up to 0.1 mm in diameter (Fig. 1). The crystals are never clustered. Kolbeckite has a white streak and vitreous lustre. X-ray powder diffraction pattern was obtained, due to the very limited amount of material available, from a single crystal using Gandolfi camera. On the pattern 45 reflections were identified from which the seven most intensive peaks are [d_{hkl} in Å (I_{obs} %, hkl)]: 4.451 (100, 002), 4.795 (89, 110), 6.71 (34, 011), 3.716 (31, 120), 5.10 (26, 020), 2.846 (24,

122) and 2.880 (21, 130). Kolbeckite is monoclinic, space group $P2_1/n$. The obtained cell parameters: $a = 5.427(2)$ Å, $b = 10.198(4)$ Å, $c = 8.909(3)$ Å, $\beta = 90.59(4)^\circ$, $V = 493.0(2)$ Å³, $Z = 4$. Average of four WDS analyses on the same crystal (in wt%): Sc_2O_3 39.02, P_2O_5 40.35, H_2O (calculated from the stoichiometry) 20.43, Al_2O_3 trace, total 99.80. The empirical formula is analogous with the ideal formula $\text{ScPO}_4 \cdot 2\text{H}_2\text{O}$. The calculated density: 2.370 g/cm³.

In Bixad kolbeckite should be a relatively low-temperature recrystallisation product of accessory zircon crystals, Sc coming from zircon (or perovskite?), while phosphorous derived from the rock-forming apatite.

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[#] **Note:** Mineralogical textbooks (*e.g.*, GAINES *et al.*, 1997; ANTHONY *et al.*, 2000) give Baia Sprie (Felsőbánya), Romania as locality of kolbeckite on the basis of old references concerning “eggonite” (KRENNER, 1929; TOKODY, 1954; for history of “eggonite” see HEY *et al.*, 1982 and PAPP, 2004). However, this occurrence is rather ambiguous, as the above mentioned papers described “eggonite” as Al phosphate, the old samples are not available any more, and new findings are not exposed.