

STUDIA UNIVERSITATIS BABEȘ-BOLYAI, GEOLOGIA, XLIX, 1, 2004, 111

NEW REPORTED MINERALS

(in forthcoming papers)

VASHEGYITE

Onac, B. P., Kearns, J., Zaharia, L. (2005) Vashegyite from the Gaura cu Muscă Cave (Locvei Mountains, Romania): a new and rare phosphate occurrence. *Studia Universitatis Babes-Bolyai, Geologia*, XLX

Vashegyite, ideally $\text{Al}_{11}(\text{PO}_4)_9(\text{OH})_6 \cdot 38\text{H}_2\text{O}$ or $\text{Al}_6(\text{PO}_4)_5(\text{OH})_3 \cdot 23\text{H}_2\text{O}$, occurs as dull (chalky) white irregular nodules up to 1.5-2.5 cm in diameter within the fresh guano deposit from the Gaura cu Muscă Cave (Locvei Mountains, SW Romania). It is friable and usually covered by a millimeter-size sandy clay film. It was characterized by means of X-ray diffraction, thermal, scanning electron microscope (SEM-EDS), infrared spectroscopy, and by chemical analysis. Under SEM, vashegyite shows euhedral and subhedral crystals (up to 10 μm across) flattened on (001) with {010} and {001} being the prominent forms. An EDS inspection of the vashegyite crystals surface indicate the presence of the following elements: Al, P, Si, S, and Fe.

Indexing of the X-ray powder pattern (Philips X-pert, $\text{CuK}\alpha$ radiation) gave orthorhombic symmetry with the following calculated parameters are $a = 10.75(6)$, $b = 15.029(9)$, $c = 22.444(5)$ Å, and $V = 3626.433(4)$ Å³; strongest lines are 11.21 (100, 002), 7.52 (77, 020), 6.9 (28, 112), 6.25 (72, 022), 3.297 (40, 312), 2.909 (60, 330), and 2.44 (15, 062).

Vashegyite IR absorption bands are comparable in position and relative intensity to bands in the spectra of other Al phosphates (variscite, wavellite, etc.). The most important absorption bands (cm^{-1}) are at 3400 and 3200 (H_2O , OH stretching), 1635 (H_2O bend), 1384 (OH δ), 1165, 1115, 1007 (PO_4 : ν_3 , antisymmetric stretching), 729 (Al-OH₂ mode or OH out-of-plane band), 603, 525, 482 (PO_4 : ν_4 , in-plane bending).

The TGA curve indicates major losses between 40 and 200°C corresponding to the removal of water molecules (endothermic peaks at 56, 82, and 128°C on the DTA curve). Although the TGA curve do not shows any significant weight loss, the DTA curve displays an endothermic effect at 860°C suggests the expulsion of OH groups and recrystallization responsible for formation of AlPO_4 .

The mineral occurs with some clay minerals, crandallite and ardealite. When the study of vashegyite will be completed, a sample of the type material will be deposited in the Mineralogical Museum of the "Babeș-Bolyai" University in Cluj, Romania.