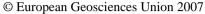
Geophysical Research Abstracts, Vol. 9, 02097, 2007

SRef-ID: 1607-7962/gra/EGU2007-A-02097





Rare minerals in the phosphate-rich deposit from the Cioclovina Cave, Romania

B. P. Onac (1,2), H. Effenberger (3) and R. Breban (4)

(1) University of South Florida, USA, (2) "Babes-Bolyai" University/"Emil Racovita" Institute of Speleology, Cluj, Romania, (3) University of Vienna, Austria, (4) Speleo Club "Proteus" Hunedoara, Romania (bonac@cas.usf.edu)

The Cioclovina Cave hosts an unusual mineral assemblage, including berlinite, churchite-Y, leucophosphite, foggite, sampleite, taranakite, tinsleyite, or crandallite; it is the type locality of ardealite. The cave is well known for hosting over 30,000 m³ of phosphate-rich sediments. Successive cave flooding events resulted in the accumulation of large quantities of clay and sand that were inter-bedded with bat guano horizons or completely buried the organic sediment.

On special interest is the occurrence of the minerals berlinite and hydroxylellestadite because they indicate high-temperatures during formation and hence their presence within a sedimentary environment is extremely surprising. The single-crystal X-ray study clearly identifies that the sample under investigation is berlinite: the refinement converged at R1(F)=0.0276, $wR2(F^2)=0.0657$ for 677 reflections $(2\eta_{MoK\alpha}\leq 70^\circ)$ and 31 variables in space-group $P3_121$ (a=4.9458(10), c=10.9526(20) Å, V=232.0 Å 3 , $Z=3\{\text{AlPO}_4\}$). Hydroxylellestadite was also investigated by single-crystal X-ray experiments (R1(F)=0.038 for 783 reflections up to $2\eta_{MoK\alpha}=70^\circ$ and 42 variables, space-group symmetry $P6_3/m$, a=9.496(2), c=6.920(2) Å, V=540.4 Å 3 , and Z=1). Furthermore, the refinement of the atomic position for the Z = (OH,Cl,F) atoms was used as an indicator for the chemical composition.

It is likely that both minerals formed due to intense thermal process (guano combustion) that affected a phosphatized, silica-rich carbonate-mudstone sedimentary sequence occurring in a restricted area within the cave.