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SPECTROSCOPIC INVESTIGATION OF SOME MINERALS FROM CAVE NO.4 – RUNCULUI HILL (METALIFERI MTS, ROMANIA)

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Trestia-Băita is a metallogenetic region located in the central part of the Metaliferi Mountains (South Eastern Apuseni Mts), characterised by a complex geological setting: Tithonic reefal limestone blocks disposed over an Early Jurassic ophiolitic basement (volcanoclastic basalts). Both limestone and ophiolites are part of the Căpâlnaş – Techereu Nappe (BALINTONI, 1997), affected by the Neogene volcanic activity. The hydrothermal activity associated to the Neogene volcanism resulted in the formation of several sulphide veins, emplaced both within limestone and basalt.

Cave no. 4 from Runcului Hill (D = 127.4 m, H = 10 m) is the largest cave in the respective karst area and consists of several rooms linked by small pits and narrow passages. One of the cave passages connects with a 13 m long and 2 m high mine gallery, with collapsed entrance, which ends in a hydrothermal vein.

The geological complexity of the area complicates the range of cave mineralogy. Fourteen minerals were identified by means of X-ray diffraction. Along with common minerals in limestone caves (calcite, aragonite and gypsum), an interesting range of other minerals were reported, few of them being exotic for cave environment.

IR and Raman spectroscopy have been used to analyse the most interesting minerals: sulphates such as serpierite $Ca(Cu,Zn)_4(OH)_6(SO_4)_2 \cdot 3H_2O$ and barite $BaSO_4$, and carbonates such as smithsonite $ZnCO_3$ and cerussite $PbCO_3$ (the last one occurring together with galena PbS).

One Raman spectrum was recorded from serpierite in the range up to 3700 cm^{-1} The other three minerals were analysed by means of IR spectroscopy, the spectra being obtained in the range of 400-4000 cm^{-1} For each spectrum the wavenumbers, characters and intensities of the bands are reported. The bands were assigned to vibrational modes of different structural groups.

Due to the fact that spectroscopic methods provide information about local structure (as site, symmetry, coordination number, local chemical and crystallographic environment) (PUTNIS, 1992), the aim of this paper is to present an interpretation of IR and Raman spectra recorded for the above-mentioned minerals, in order to give a better crystal chemical characterisation in each case.

References

BALINTONI, I. (1997): Geologia terenurilor metamorfice din Romania. Ed. Carpatica, Cluj-Napoca. 174 p.
PUTNIS, A (1992): Introduction to Mineral Sciences. Cambridge Univ. Press. 479 p.