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PŮVODNÍ PRÁCE/ORIGINAL PAPER

Ktenasit a jeho minerální asociace z ložiska Zlaté Hory - východ (Česká republika)

Ktenasite and its mineral association from the ore deposit Zlaté Hory - East (Czech Republic)

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Abstract

The rare Cu-Zn sulphate, ktenasite, was found in the association with schulenbergite, serpierite, gypsum and brochantite at abandoned stope of the Modrá štola adit, the ore deposit Zlaté Hory - East, Czech Republic. Ktenasite occurs there as two different (color, morphology) types, the first is olive green to dark green columnar crystals up to 4 mm in length which forms radially arranged groups or rich crystalline coatings. The second type is represented by blue to greenish blue crystalline coatings or hemispherical or fan-shaped aggregates formed by thin tabular crystals. The X-ray powder diffraction data, Raman spectra and chemical composition of both types are almost identical. Ktenasite is monoclinic, space group $P2_1/c$, the unit-cell parameters refined from X-ray powder diffraction data are: a 5.610(2), b 6.123(2), c 23.827(9) Å, β 95.27(3)° and V 815.0(4) Å³. Its chemical analyses correspond to the empirical formula $Zn_{1.00}(Cu_{3.13}Zn_{0.96}Mg_{0.07}Al_{0.01})_{\Sigma 4.17}(SO_4)_{1.98}(PO_4)_{0.01}(SiO_4)_{0.01}(OH)_{6.32} \cdot 6H_2O$. Schulenbergite most often occurs only as an admixture in blue-green crystalline aggregates of ktenasite, sometimes together with serpierite. More rarely, its blue tabular crystals with a pearly luster up to 0.4 mm in size were also observed. Schulenbergite is trigonal, space group $R-3$, the unit-cell parameters refined from X-ray powder diffraction data are: a 8.187(3), c 7.012(4) Å and V 410.5(3) Å³. Its chemical analyses correspond to the empirical formula $(Cu_{4.96}Zn_{2.34})_{7.30}(SO_4)_{1.92}(SiO_4)_{0.05}(PO_4)_{0.02}(OH)_{10.47} \cdot 6H_2O$. Serpierite is relatively abundant in the studied mineral association, usually forms light blue fine crystalline coatings, its fan-shaped aggregates up to 4 mm in size formed by elongated tabular crystals have also been found more rarely. Its chemical analyses correspond to the empirical formula $(Ca_{1.14}Mn_{0.03}Mg_{0.02})_{\Sigma 1.19}(Cu_{3.08}Zn_{0.73})_{\Sigma 3.81}(SO_4)_{1.99}(PO_4)_{0.02}(OH)_{5.97} \cdot 3H_2O$. Abundant brochantite forms bright green crystalline coatings and tiny dark green to black-green crystals. Its chemical analyses correspond to the empirical formula $(Cu_{3.80}Zn_{0.17}Al_{0.02})_{\Sigma 3.99}(SO_4)_{0.99}(PO_4)_{0.01}(OH)_{6.00}$. The origin of studied mineral association is connected with sub-recent weathering of primary sulphides (pyrite, pyrrhotite, sphalerite and chalcopyrite) in the conditions of abandoned mine space.

Key words: ktenasite, schulenbergite, serpierite, supergene mineralization, X-ray powder diffraction data, unit-cell parameters, chemical composition, Raman spectroscopy, ore deposit Zlaté Hory - East, Czech Republic

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