PŮVODNÍ PRÁCE/ORIGINAL PAPER

Nové údaje o supergénnych mineráloch z banského poľa Rainer, ložisko Ľubietová - Podlipa (Slovenská republika)

New data on supergene minerals from the Rainer mining field, Ľubietová - Podlipa deposit (Slovak Republic)

Martin Števko[1)]*, Jiří Sejkora[2)] a Radana Malíková[2)]

*[1)]Univerzita Komenského v Bratislave, Prírodovedecká fakulta, Katedra mineralógie a petrológie, Ilkovičova 6, 842 15 Bratislava IV, Slovenská republika; *e-mail: stevko@fns.uniba.sk*
[2)]Mineralogicko-petrologické oddělení, Národní muzeum, Cirkusová 1740, 193 00 Praha 9 - Horní Počernice, Česká republika

Števko M., Sejkora J., Malíková R. (2016) Nové údaje o supergénnych mineráloch z banského poľa Rainer, ložisko Ľubietová - Podlipa (Slovenská republika). *Bull. mineral.-petrolog. Odd. Nár. Muz. (Praha) 24, 1, 1-12. ISSN: 1211-0329.*

Abstract

An interesting supergene mineral association with bismutite, Bi and Cu-rich corkite and kintoreite, mrázekite and petitjeanite was recently identified at the Rainer mining field, Ľubietová-Podlipa copper deposit near Banská Bystrica, Slovak Republic. Bismutite is common mineral in studied samples and it occurs as yellowish-green to pale yellow, powdery to earthy aggregates up to 6 x 1.5 cm in size, which are embedded in quartz and represent pseudomorphs after accumulations of preexisting Cu-Bi or Cu-Pb-Bi sulfosalts. It was identified by PXRD and its refined unit-cell parameters (for the orthorhombic space group *Imm*2) are: *a* 3.873(2), *b* 3.874(4) Å, *c* 13.722(9) Å and *V* 205.9(3) Å^3. Corkite forms yellowish-green, irregular to hemispherical aggregates up to 1 mm in size, which consists of well-developed rhombohedral crystals up to 30 μm. It is associated with bismutite, mrázekite, goethite, malachite and pseudomalachite. The unit-cell parameters of corkite refined from the powder X-ray diffraction data (for the trigonal space group *R*-3*m*) are: *a* 7.277(8), *c* 16.740(6) Å with *V* 768.8(1) Å^3. Its chemical composition is distinctive by unusually high concentrations of Bi (up to 0.28 *apfu*) and Cu (up to 1.06 *apfu*), with the average (n=19) empirical formula corresponding to $(Pb_{0.88}Bi_{0.16})_{\Sigma 1.04}(Fe_{2.42}Cu_{0.72}Al_{0.05})_{\Sigma 3.19}[(PO_4)_{0.99}(SO_4)_{0.77}(PO_3OH)_{0.23}(AsO_4)_{0.01}]_{\Sigma 2.00}(OH)_{6.10}$ on the basis of P+As+S+Si = 2 *apfu*. Kintoreite occurs as greenish-yellow, fine crystalline coatings, which cover areas up to 2 x 2 cm, in association with mrázekite, bismutite, petitjeanite, pseudomalachite and goethite. The unit-cell parameters of kintoreite refined from the powder X-ray diffraction data (for the trigonal space group *R*-3*m*) are: *a* 7.285(8), *c* 16.883(5) Å with *V* 776(1) Å^3. It contain elevated amounts of Bi (up to 0.10 *apfu*) and Cu (up to 0.22 *apfu*) and its average (n=6) empirical formula can be expressed as $(Pb_{0.93}Bi_{0.08}K_{0.04}Ca_{0.01})_{\Sigma 1.06}(Fe_{2.48}Al_{0.34}Cu_{0.14})_{\Sigma 2.96}[(PO_3OH)_{1.00}(PO_4)_{0.81}(SiO_4)_{0.16}(SO_4)_{0.02}(AsO_4)_{0.01}]_{\Sigma 2.00}(OH)_{5.73}$ on the basis P+As+S+Si = 2 *apfu*. Mrázekite is relatively abundant in studied samples and it is often closely associated with bismutite. It occurs as cerulean-blue crusts, hemispherical or irregular crystalline aggregates. Radial aggregates of well-developed acicular to thin-tabular crystals of mrázekite are infrequent. The unit-cell parameters of mrázekite refined from the powder X-ray diffraction data (for the monoclinic space group $P2_1/m$) are: *a* 9.067(5), *b* 6.341(4), *c* 21.252(9) Å, *β* 101.64(4)° with *V* 1197(1) Å^3. Its average (n = 8) empirical formula is $(Bi_{1.95}Pb_{0.02})_{\Sigma 1.97}(Cu_{2.91}Fe_{0.02}Al_{0.01})_{\Sigma 2.94}[(PO_4)_{1.99}(AsO_4)_{0.01}]_{\Sigma 2.00}O_{2.00}(OH)_{1.78}\cdot 2H_2O$ based on P+As = 2 *apfu*. Petitjeanite is very rare and it forms microscopic, irregular aggregates and crusts up to 200 μm associated with goethite, pseudomalachite, mrázekite and kintoreite. It was confirmed by EPMA-WDS and its average (n = 4) empirical formula can be expressed as $(Bi_{2.67}Pb_{0.16}Al_{0.08}Fe_{0.05}K_{0.03}Cu_{0.03}Ca_{0.02})_{\Sigma 3.04}[(PO_4)_{1.84}(SiO_4)_{0.09}(AsO_4)_{0.07}]_{\Sigma 2.00}O_{1.00}(OH)_{0.72}$ on the basis P+As+Si = 2 *apfu*.

Key words: *bismutite, corkite, kintoreite, mrázekite, petitjeanite, supergene minerals, X-ray powder data, chemical composition, Podlipa deposit, Ľubietová, Slovak Republic*

Obdrženo: 2. 11. 2015; přijato: 7. 7. 2016