PŮVODNÍ PRÁCE/ORIGINAL PAPER

Cowlesit a doprovodná mineralizace z vrchu Hackenberg u České Kamenice (Česká republika)

Cowlesite and accompanying mineralization from the Hackenberg hill near Česká Kamenice (Czech Republic)

Petr Pauliš[1,2]*, Libor Hrůzek[3], Oldřich Janeček[4], Jiří Sejkora[2] a Radana Malíková[2]

[1]Smíškova 564, 284 01 Kutná Hora; *e-mail: petr.paulis@post.cz
[2]Mineralogicko-petrologické oddělení, Národní muzeum, Cirkusová 1740, 193 00 Praha 9 - Horní Počernice
[3]Pobřežní 1016, 471 14 Kamenický Šenov
[4]Albrechtická 613, 434 01 Most

Pauliš P., Hrůzek L., Janeček O., Sejkora J., Malíková R. (2014) Cowlesit a doprovodná mineralizace z vrchu Hackenberg u České Kamenice (Česká republika). *Bull. mineral.-petrolog. Odd. Nár. Muz. (Praha) 22, 2, 248-260. ISSN 1211-0329.*

Abstract

Nine zeolites were found at the Hackenberg hill, a very interesting mineralogical site located 2 km southwest from Česká Kamenice (northern Bohemia, Czech republic). These zeolites were found in the cavities which are located at the contact of basalt, volcanic tuffs and breccia. Cowlesite forms white hemispherical aggregates with size up to 10 mm, which belongs to the world´s largest examples of this species. The unit cell parameters of cowlesite, refined from powder X-ray data, are *a* 11.267(7), *b* 15.255(7), *c* 11.992(8) Å and *V* 2061(5) Å^3. Chemical analyses of cowlesite correspond to the empirical formula $Ca_{0.90}Na_{0.12}Mg_{0.01}K_{0.01}(Al_{1.89}Si_{3.10})O_{10}\cdot 4\ H_2O$. Lévyne-Ca forms hexagonal tabular colorless crystals with an average size of 2 - 4 mm. The unit cell parameters of lévyne-Ca, refined from powder X-ray data, are *a* 13.330(3), *c* 23.0122(3) Å and *V* 3541.3(9) Å^3. Its empirical formula is $Ca_{2.76}K_{0.68}Na_{0.17}Sr_{0.02}(Si_{14.46}Al_{6.36})O_{36}\cdot 18H_2O$. Erionite-Ca forms white epitaxial aggregates on the surface (0001) of lévyne-Ca crystals. These aggregates are composed of fine needles oriented perpendicular to the surface of lévyne-Ca. Its chemical analyses correspond to the empirical formula $Ca_{2.76}K_{0.68}Na_{0.17}Sr_{0.02}(Si_{14.46}Al_{6.36})O_{36}\cdot 18H_2O$. Gismondine, the rarest mineral found at this site, forms typical colorless to whitish dipyramidal crystals with size up to 1 mm. The unit cell parameters of gismondine, refined from powder X-ray data, are *a* 10.021(2), *b* 10.630(3), *c* 9.828(3) Å, *β* 92.51° and *V* 1045.8(5) Å^3. Chemical analyses of gismondine correspond to the empirical formula $Ca_{1.98}Na_{0.06}(Si_{4.10}Al_{3.85})O_{16}\cdot 8H_2O$. Thomsonite-Ca forms colorless to yellowish tabular crystals and hemispherical aggregates. The unit cell parameters of thomsonite-Ca, refined from powder X-ray data are *a* 13.104(2), *b* 13.056(1), *c* 13.247(2) Å and *V* 2266.4(6) Å^3. The empirical formula of thomsonite-Ca can be expressed as $Ca_{1.78}Sr_{0.05}Na_{1.12}(Al_{4.69}Si_{5.29})O_{20}\cdot 6H_2O$. Phillipsite-K forms typical columnar colorless to whitish crystals with a size 1 - 2 mm. The unit cell parameters of phillipsite-K, refined from powder X-ray data, are *a* 9.917(4), *b* 14.314(8), *c* 8.737(4) Å, *β* 124.920° and *V* 1016.9(9) Å^3. Chemical analyses of phillipsite-K correspond to the empirical formula $K_{1.95}Ca_{1.91}Na_{0.12}(Si_{10.09}Al_{5.91})O_{32}\cdot 12H_2O$. Chabazite-Ca forms colorless glassy rhombohedron. The unit cell parameters of chabazite-Ca, refined from powder X-ray data, are *a* 13.837(6), *c* 15.0073(4) Å and V 2488(1) Å^3. Its empirical formula is $Ca_{1.54}Na_{0.20}K_{0.14}Sr_{0.04}(Al_{3.46}Si_{8.53})O_{24}\cdot 13H_2O$. Natrolite forms whitish needles and hemispheres of up to 1 cm, which fill in cavities up to 5 cm. The unit cell parameters of natrolite, refined from powder X-ray data are *a* 18.376(5), *b* 18.552(5), *c* 6.585(2) Å and *V* 2244(1) Å^3. The empirical formula can be expressed as $Na_{1.79}Ca_{0.10}(Si_{3.01}Al_{1.99})O_{10}\cdot 2H_2O$. Analcime occurs in the cavities together with larger hemispheres of cowlesite and lévyne-Ca and it forms whitish lenticular crystals. The unit cell parameters of analcime, refined from powder X-ray data are *a* 13.703(5) Å and *V* 573(1) Å^3. Chemical analyses of analcime correspond to the empirical formula $Na_{0.90}K_{0.01}(Al_{0.93}Si_{2.07})O_6\cdot H_2O$.

Key words: *cowlesite, lévyne-Ca, erionite-Ca, gismondine, thomsonite-Ca, phillipsite-K, chabazite-Ca, natrolite, analcime, powder X-ray diffraction data, unit-cell parameters, chemical composition, Hackenberg near Česká Kamenice, Czech Republic*

Obdrženo: 4. 9. 2014; přijato: 19. 11. 2014