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Phurcalit a uranofán-beta z Ruprechtic u Liberce (Česká republika)

Phurcalite and uranophane-beta from Ruprechtice near Liberec (Czech Republic)

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Abstract

A rare uranium supergene minerals, phurcalite and uranophane-beta, were found in association with metaautunite at fissures of granitoid rocks in the active Wagner quarry in Ruprechtice near Liberec (northern Bohemia, Czech Republic). Phurcalite occurs there as bright to deep yellow coatings with an area up to 10 × 3 mm in size composed of acicular to columnar crystals up to 0.5 mm in length. It is orthorhombic, space group *Pbca*, the unit-cell parameters refined from X-ray powder diffraction data are: *a* 17.3973(18), *b* 16.0161(15), *c* 13.5693(19) Å, V 3780.9(5) Å^3. Chemical analyses of phurcalite correspond to the empirical formula $Ca_{2.20}(UO_2)_{3.06}(PO_4)_{1.96}(AsO_4)_{0.04}O_{2.26}\cdot 7H_2O$. Uranophane-beta forms a relatively abundant pale yellow coatings of up to 2 × 2 cm in size composed of translucent to transparent acicular crystals with a vitreous lustre and a length of up to 0.2 mm. It is monoclinic, space group $P2_1/a$, the unit-cell parameters refined from X-ray powder diffraction data are: *a* 13.959(2), *b* 15.5420(16), *c* 6.6227(9) Å, *β* 91.43(1)° and *V* 1436.3(2) Å^3. Chemical analyses of uranophane-beta correspond to the empirical formula $Ca_{1.09}(UO_2)_{1.99}[(SiO_3OH)_{1.68}(PO_4)_{0.29}(AsO_4)_{0.03}]_{\Sigma 2.00}\cdot 5H_2O$. Metaautunite occurs there as abundant light yellow aggregates with an area up to some cm^2 in size composed of tiny (up to 0.5 mm) tabular crystals or rarely as well-developed individual tabular crystals up to several mm in size. It clearly differs from other minerals in the association by very strong yellow-green luminescence in both short- and long-wave UV radiation. It is tetragonal, space group *P*4/*nmm*, the unit-cell parameters refined from X-ray powder diffraction data are: *a* 7.006(2), *c* 16.899(4) Å and *V* 829.4(6) (5) Å^3. Chemical analyses of metaautunite correspond to the empirical formula $Ca_{1.03}(UO_2)_{2.09}(PO_4)_{1.96}(AsO_4)_{0.04}\cdot 6H_2O$.

Key words: *phurcalite, uranophane-beta, uranium minerals, unit-cell parameters, chemical composition, Ruprechtice, Czech Republic*

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