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Ammoniozippeite from the Jáchymov ore district, Krušné hory Mountains (Czech Republic) - description and Raman spectroscopy

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Abstract

We have undertaken a study of the rare ammonium uranyl sulphate mineral, ammoniozippeite, from the Jáchymov ore district, Krušné hory Mountains (Czech Republic). It has been found on a few specimens and forms rich crystalline aggregates in thin cracks of supergene altered rocks with uraninite veinlets in association with gypsum. Its radially arranged aggregates are composed by well-developed flattened acicular crystals up to 1 mm in length. Ammoniozippeite is bright yellow and locally even yellow-orange with pale yellow streak and fluoresces yellow, weak or dull under 254 nm and 366 nm UV-radiation, respectively. Ammoniozippeite crystals are transparent to translucent and have an intensive vitrous luster. It is a very brittle and at least one system of perfect cleavage (along {010}) was observed. The quantitative chemical analyses of ammoniozippeite agree well with the proposed ideal composition and correspond to the following empirical formula $[(NH_4)_{1.96}K_{0.11}]_{\Sigma 2.07}[(UO_2)_2(SO_4)_{1.98}O_{2.06}]\cdot H_2O$ (on the basis of 2 U atoms *pfu*). Ammoniozippeite is orthorhombic, the space group *Ccmb*, with the unit-cell parameters refined from X-ray powder diffraction data: *a* 8.7862(13), *b* 14.1579(19), *c* 17.162(2) Å and *V* 2134.8(4) Å^3. Vibrational (Raman and infrared) spectroscopy documented the presence molecular water, ammonium, uranyl and suphate units in the crystal structure of ammoniozippeite.

Key words: *ammoniozippeite, zippeite group, unit-cell parameters, chemical composition, Raman spectroscopy, infrared spectroscopy, Jáchymov, Czech Republic*

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