

Posnjakite

$\text{Cu}_4(\text{SO}_4)(\text{OH})_6 \cdot \text{H}_2\text{O}$

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Crystal Data: Monoclinic, pseudo-hexagonal. *Point Group:* *m*. Tabular crystals, pseudo-hexagonal, to 3 mm; as rich crystalline coatings to massive films, granular.

Physical Properties: *Tenacity:* Brittle. Hardness = 1.5–3 *D*(meas.) = 3.32
D(calc.) = 3.35

Optical Properties: Semitransparent. *Color:* Blue to dark blue. *Streak:* Pale blue.
Luster: Vitreous.

Optical Class: Biaxial (–). *Pleochroism:* *X* = pale blue to colorless; *Y* = blue to dark blue; *Z* = greenish blue to blue. *Absorption:* $Y \gg Z > X$. $\alpha = 1.625$ $\beta = 1.680$ $\gamma = 1.706$
 $2V$ (meas.) = 57°

Cell Data: *Space Group:* *Pm*. $a = 10.578(5)$ $b = 6.345(3)$ $c = 7.863(3)$ $\beta = 117.98(5)^\circ$
Z = 2

X-ray Powder Pattern: Nura-Taldy deposits, Kazakhstan.
7.0 (10), 3.46 (8), 2.70 (7), 2.61 (7), 2.41 (7), 2.015 (7), 1.538 (7)

Chemistry:	(1)	(2)	(1)	(2)	
SO_3	17.25	17.02	MgO	0.05	
Fe_2O_3	0.38		CaO	0.34	
CuO	65.53	67.66	H_2O	16.70	15.32
			Total	100.25	100.00

(1) Festival deposit, Siberia, Russia; corresponds to $(\text{Cu}_{3.90}\text{Fe}_{0.03}^{3+})_{\Sigma=3.93}(\text{S}_{1.03}\text{O}_4)(\text{OH})_6 \cdot 1.5\text{H}_2\text{O}$.

(2) $\text{Cu}_4(\text{SO}_4)(\text{OH})_6 \cdot \text{H}_2\text{O}$.

Occurrence: A secondary mineral formed in the oxidized zone of copper-bearing hydrothermal mineral deposits, commonly of post-mine origin; may occur in slags.

Association: Brochantite, langite, devilline, serpierite, woodwardite, wroewolfeite, aurichalcite, azurite, malachite, chalcopyrite.

Distribution: Numerous minor localities. From the Nura-Taldy tungsten deposits, central Kazakhstan. In England, fine examples from Cornwall, as at the Drakewalls mine, Gunnislake, and the Fowey Consols mine, Tywardreath. Large crystals in the Penrhiw mine, Ystumtuen, Dyfed, Wales. At the Muckross mine, Co. Kerry, Ireland. In France, in the Salsigne mine, 15 km north of Carcassonne, Aude. At Mitterberg, Salzburg, and Brixlegg, Tirol, Austria. From Špania Dolina (Herrengrund), Slovakia. In the USA, in the Yellow Pine mine, Crisman, Boulder Co., Colorado, and at the Majuba Hill mine, Antelope district, Pershing Co., Nevada. In Canada, from the Ives mine, near Eastman, Quebec, and in the Rocher Deboule mine, near Hazelton, British Columbia. From the Marharahara copper mine, near Woodville, New Zealand. At Tsumeb, Namibia.

Name: To honor Eugene Valdemar Posnjak (1888–1949), Geophysical Laboratory, Washington, D.C., USA, who investigated the $\text{CuO}-\text{SO}_3-\text{H}_2\text{O}$ system.

Type Material: Mining Institute, St. Petersburg, Russia, 1386/1.

References: (1) Komkov, A.I. and E.I. Nefedov (1967) Posnjakite – a new mineral. *Zap. Vses. Mineral. Obshch.*, 96, 58–62 (in Russian). (2) (1967) *Amer. Mineral.*, 52, 1582–1583 (abs. ref. 1). (3) Mellini, M. and S. Merlino (1979) Posnjakite ${}^2[\text{Cu}_4(\text{OH})_6(\text{H}_2\text{O})\text{O}]$ octahedral sheets in its structure. *Zeits. Krist.*, 149, 249–257. (4) Yakhontova, L.K., V.P. Postnikova, Y.V. Vlasova, and N.Y. Sergeyeva (1981) New data on posnjakite, serpierite, and woodwardite. *Doklady Acad. Nauk SSSR*, 256, 1221–1225 (in Russian).

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