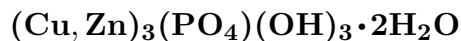


# Veszelyite



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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . Prismatic crystals, flattened on {100}, elongated along [001], to 5 cm, also typically pseudo-octahedral, {100} and {011}, modified by {001}, {110}, {111}, {121}; may be in granular aggregates.

**Physical Properties:** *Cleavage:* On {001} and {110}. *Hardness* = 3.5–4 *D*(meas.) = 3.4(1) *D*(calc.) = 3.42

**Optical Properties:** Translucent. *Color:* Greenish blue to dark blue; greenish blue in transmitted light. *Streak:* Green to white. *Luster:* Vitreous.

*Optical Class:* Biaxial (+). *Pleochroism:* Faint; *X* = greenish blue; *Z* = blue. *Orientation:*  $Y = b$ ;  $Z \wedge c = -35^\circ$  to  $-43^\circ$ . *Dispersion:*  $r < v$ , weak to strong.  $\alpha = 1.618$ – $1.640$   $\beta = 1.622$ – $1.658$   $\gamma = 1.658$ – $1.695$   $2V$ (meas.) =  $38^\circ$ – $71^\circ$

**Cell Data:** *Space Group:*  $P2_1/a$ .  $a = 9.8275(22)$   $b = 10.2244(30)$   $c = 7.5322(28)$   $\beta = 103.18(2)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Morávicza, Romania. (ICDD 12-525).

3.642 (100), 6.96 (40), 4.489 (30), 3.482 (30), 2.771 (30), 7.29 (25), 2.956 (25)

## Chemistry:

	(1)	(2)
P <sub>2</sub> O <sub>5</sub>	18.43	19.01
FeO	0.06	
NiO	trace	
CuO	37.82	40.44
ZnO	26.69	23.64
PbO	0.05	
H <sub>2</sub> O	16.87	16.22
Total	99.92	99.31

(1) Morávicza, Romania. (2) Arakawa mine, Japan; corresponds to  $(\text{Cu}_{1.77}\text{Zn}_{1.24})_{\Sigma=3.01}(\text{PO}_4)(\text{OH})_3 \cdot 2\text{H}_2\text{O}$ .

**Occurrence:** A rare secondary mineral in the oxidized zone of some base-metal mineral deposits.

**Association:** Pseudomalachite, malachite, hemimorphite, pyromorphite, kipushite, vauquelinite, libethenite, quartz, iron oxides (Kipushi mine, Congo); hemimorphite, malachite, aurichalcite, brochantite (Wanlockhead, Scotland).

**Distribution:** From Ocna de Fier (Morávicza; Vaskó), Romania. At Zdravo Vrelo, near Sarajevo, Bosnia-Herzegovina. In the Straitstep vein, Wanlockhead, Dumfriesshire, Scotland. From Kipushi, 28 km southwest of Lubumbashi, Katanga Province, Congo (Shaba Province, Zaire). At Kabwe (Broken Hill), Zambia. In the Hisaichi (Arakawa) mine, Akita Prefecture, and the Kamioka mine, Gifu Prefecture, Japan. In the USA, large crystals from the Black Pine mine, near Philipsburg, Granite Co., Montana; from Gold Hill, Tooele Co., Utah. At the La Esperanza mine, Mayapa, Zacapoaxtla district, Puebla, Mexico.

**Name:** Honoring A. Veszelyi (1820–1888), Hungarian mining engineer, who discovered the species.

**Type Material:** n.d.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 916–917. (2) Ghose, S., S.R. Leo, and C. Wan (1974) Structural chemistry of copper and zinc minerals: Part I. Veszelyite,  $(\text{Cu, Zn})_2\text{ZnPO}_4(\text{OH})_3 \cdot 2\text{H}_2\text{O}$ : a novel type of sheet structure and crystal chemistry of copper-zinc substitution. *Amer. Mineral.*, 59, 573–581. (3) Hintze, C. (1933) *Handbuch der Mineralogie*, I(4.2), 891–893.

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