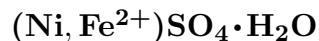


# Dwornikite



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**Crystal Data:** Monoclinic (by analogy to kieserite group). *Point Group:*  $2/m$ . As aggregates of anhedral grains, to  $1 \mu\text{m}$ , intermixed with other species.

**Physical Properties:** *Fracture:* [Conchoidal to uneven.] (by analogy to szomolnokite). *Tenacity:* [Brittle.] *Hardness* = [2.5] *D*(meas.) = n.d. *D*(calc.) = 3.357 [Slowly soluble in  $\text{H}_2\text{O}$ .]

**Optical Properties:** Semitransparent. *Color:* White, may have a greenish tint from impurities. *Luster:* [Vitreous.] *Optical Class:* Biaxial, with fairly strong birefringence.  $n = 1.63$   $\alpha = \text{n.d.}$   $\beta = \text{n.d.}$   $\gamma = \text{n.d.}$   $2V$ (meas.) = n.d.

**Cell Data:** *Space Group:*  $C2/c$  (synthetic).  $a = 6.824(2)$   $b = 7.594(2)$   $c = 7.457(1)$   
 $\beta = 117.79(1)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Minasragra, Peru.  
3.342 (100), 4.732 (70), 3.024 (70), 4.754 (50), 3.293 (35), 2.4912 (35), 3.792 (25)

<b>Chemistry:</b>	(1)
	$\text{SO}_3$ 42.4
	FeO 9.3
	NiO 39.0
	$\text{H}_2\text{O}$ n.d.
	<hr/>
	Total

(1) Minasragra, Peru; by X-ray fluorescence, average of four partial analyses; corresponds to  $(\text{Ni}_{0.80}\text{Fe}_{0.20})_{\Sigma=1.00}(\text{SO}_4)_2 \cdot \text{H}_2\text{O}$ .

**Mineral Group:** Kieserite group.

**Occurrence:** In a vanadium sulfide deposit, probably by oxidation of associated bravoite.

**Association:** Patronite, sulfur, retgersite, szomolnokite, "bitumen".

**Distribution:** At Minasragra, 46 km from Cerro de Pasco, Peru.

**Name:** Honors Edward J. Dwornik (1920– ), Lunar geologist and mineralogist, U.S. Geological Survey, Washington, D.C., USA, who studied several vanadium deposits.

**Type Material:** George Washington University, Washington, D.C., USA.

**References:** (1) Milton, C., H.T. Evans, Jr., and R.G. Johnson (1982) Dwornikite,  $(\text{Ni}, \text{Fe})\text{SO}_4 \cdot \text{H}_2\text{O}$ , a member of the kieserite group from Minasragra, Peru. *Mineral. Mag.*, 46, 351–355. (2) (1983) *Amer. Mineral.*, 68, 642 (abs. ref. 1). (3) Wildner, M. and G. Giester (1991) The crystal structures of kieserite-type compounds. I. Crystal structures of  $\text{Me}(\text{II})\text{SO}_4 \cdot \text{H}_2\text{O}$  (Me = Mn, Fe, Co, Ni, Zn). *Neues Jahrb. Mineral., Monatsh.*, 296–306.