

**Ilesite****(Mn<sup>2+</sup>, Zn, Fe<sup>2+</sup>)SO<sub>4</sub>•4H<sub>2</sub>O**

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**Crystal Data:** Monoclinic. *Point Group:* 2/*m*. As prismatic crystals, to 1 mm, commonly aggregated as vein fillings and incrustations.

**Physical Properties:** Hardness = [2–3] (by analogy to rozenite group members).  
D(meas.) = 2.26 (synthetic MnSO<sub>4</sub>•4H<sub>2</sub>O). D(calc.) = 2.26 Soluble in H<sub>2</sub>O.

**Optical Properties:** Transparent. *Color:* Green, becoming white through dehydration.  
*Optical Class:* Biaxial (–) (synthetic MnSO<sub>4</sub>•4H<sub>2</sub>O). *Orientation:* Y = b; Z ∧ c = 5°.  
α = 1.508 β = 1.518 γ = 1.522 2V(meas.) = Moderate.

**Cell Data:** *Space Group:* P2<sub>1</sub>/*n* (synthetic MnSO<sub>4</sub>•4H<sub>2</sub>O). a = 5.94(1) b = 13.76(2)  
c = 8.01(1) β = 90°48(10)' Z = 4

**X-ray Powder Pattern:** Synthetic MnSO<sub>4</sub>•4H<sub>2</sub>O. (ICDD 32-651).  
4.55 (100), 5.5 (90), 4.01 (90), 2.99 (90), 3.46 (80), 3.28 (80), 3.01 (70)

**Chemistry:**

	(1)
SO <sub>3</sub>	36.07
FeO	4.18
MnO	22.31
ZnO	5.97
H <sub>2</sub> O	31.60
Total	100.13

(1) Hall Valley, Colorado, USA; corresponds to (Mn<sub>0.70</sub>Zn<sub>0.17</sub>Fe<sub>0.13</sub>)<sub>Σ=1.00</sub>SO<sub>4</sub>•4H<sub>2</sub>O.

**Mineral Group:** Rozenite group.

**Occurrence:** A rare secondary mineral in the oxidized zones of sulfide deposits.

**Association:** Pyrite, sphalerite, galena (McDonnell claim, Colorado, USA); rozenite, epsomite, copiapite, gypsum, melanterite, chvaleticeite (Chvaletice, Czech Republic).

**Distribution:** In the USA, from the McDonnell claim, Montezuma district, Hall Valley, Park Co., and at the Penn mine, Summit Co., Colorado. In the Silver King mine, Galena Hill, Yukon Territory, Canada. From Chvaletice, Czech Republic. At the Jokoku mine, southwest Hokkaido, Japan.

**Name:** Honors Malvern Wells Iles (1852–1890), American metallurgist of Denver, Colorado, USA, who made the first chemical analysis of the species.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 486–487. (2) Bauer, W.H. (1962) Zur Kristallchemie der Salzhydrate. Die Kristallstrukturen von MgSO<sub>4</sub>•4H<sub>2</sub>O (Leonhardtite) und FeSO<sub>4</sub>•4H<sub>2</sub>O (Rozenit). Acta Cryst., 15, 815–826. (3) Pasáva, J., K. Breiter, M. Huka, and J. Korecký (1986) Chvaleticeite, (Mn, Mg)SO<sub>4</sub>•6H<sub>2</sub>O, a new mineral. Neues Jahrb. Mineral., Monatsh., 121–125.