Pentahydrite $MgSO_4 \cdot 5H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Typically as efflorescences.

Physical Properties: Hardness = n.d. D(meas.) = 1.896 D(calc.) = 1.90 Soluble in H_2O.

Optical Properties: Semitransparent. *Color:* White, pale blue or pale green from impurities. *Optical Class:* Biaxial (–). *Dispersion:* $r < v$. α = 1.482–1.495 β = 1.492–1.512 γ = 1.493–1.518 2V(meas.) = 55°

Cell Data: *Space Group:* $P\overline{1}$ (synthetic). $a = 6.314(5)$ $b = 10.505(18)$ $c = 6.030(6)$ $\alpha = 81°7(12)'$ $\beta = 109°49(12)'$ $\gamma = 105°5(3)'$ Z = 2

X-ray Powder Pattern: Synthetic.
4.93 (100), 3.26 (40), 5.15 (30), 3.65 (30), 2.95 (30), 1.995 (35), 2.79 (25)

Chemistry:

	(1)	(2)	(3)
SO_3	38.51	38.13	38.05
FeO		0.23	
MnO		0.14	
NiO		0.11	
MgO	19.35	17.91	19.15
CaO		0.13	
H_2O	42.03	42.97	42.80
Total	99.89	99.62	100.00

(1) Cripple Creek, Colorado, USA. (2) The Geysers, California, USA. (3) $MgSO_4 \cdot 5H_2O$.

Mineral Group: Chalcanthite group.

Occurrence: An efflorescence on shales (Grand Junction, Colorado, USA); an efflorescence on mine timbers (Virginia City, Nevada, USA); in acid sulfate soils (Basse-Casamance Valley, Senegal).

Association: Alunogen, chalcanthite.

Distribution: Modern confirmation of some localities listed would be desirable. In the USA, from Cripple Creek, Teller Co., and northwest of Grand Junction, in the West Salt Creek watershed, Mesa Co., Colorado; at The Geysers, Sonoma Co., California; from Virginia City, Comstock district, Storey Co., Nevada. At Copaquire, Tarapacá, Chile. In the Basse-Casamance Valley, Senegal.

Name: From the Greek *penta*, for *five*, alluding to the amount of water in its composition.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 492–493. (2) Baur, W.H. and J.L. Rolin (1972) Salt hydrates. IX. The comparison of the crystal structure of magnesium sulfate pentahydrate with copper sulfate pentahydrate and magnesium chromate pentahydrate. Acta Cryst., 28, 1448–1455. (3) von Hodenberg, R.F. and R. Kühn (1967) Zur Kenntnis der Magnesiumsulfathydrate und der Effloreszenzen des Kieserits von Hartsalzen. Kali und Steinsalz, 4, 326–340 (in German).