Metavariscite $AlPO_4 \cdot 2H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As pseudo-orthorhombic crystals, composed principally of {010}, {011}, {130}, {110}; tabular on {010} and either equant or bladed by elongation along [100] or [001]; in spheroidal aggregates, granular. *Twinning:* By contact on {102}.

Physical Properties: *Cleavage:* On {010}. Hardness = 3.5 D(meas.) = 2.51–2.54 D(calc.) = 2.535

Optical Properties: Transparent to translucent. *Color:* Pale green; colorless in transmitted light. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Pleochroism:* Weak; X = colorless; $Y = Z$ = light green.
Orientation: $Y = b$. *Dispersion:* $r < v$, perceptible. $\alpha = 1.551$ $\beta = 1.558$ $\gamma = 1.582$
2V(meas.) = 55°

Cell Data: *Space Group:* $P2_1/n$. $a = 5.178(2)$ $b = 9.514(2)$ $c = 8.454(2)$ $\beta = 90.35(2)°$
Z = 4

X-ray Powder Pattern: Lucin, Utah, USA. (ICDD 33-32).
4.758 (100), 2.705 (95), 4.552 (75), 4.227 (65), 3.503 (60), 6.325 (25), 2.290 (20)

Chemistry:

	(1)	(2)
P_2O_5	44.73	44.92
V_2O_3	0.32	
Al_2O_3	32.40	32.27
Fe_2O_3	0.06	
Cr_2O_3	0.18	
H_2O	22.68	22.81
Total	100.37	100.00

(1) Utahlite Hill, Utah, USA. (2) $AlPO_4 \cdot 2H_2O$.

Polymorphism & Series: Dimorphous with variscite.

Occurrence: Commonly a product of weathering phosphatic rocks; may form as concretions by the phosphatization of kaolin during weathering; probably a reaction product of phosphate fertilizer in acid soil.

Association: Variscite.

Distribution: In the USA, from the Edison-Bird mine, on Utahlite Hill, eight km northwest of Lucin, Box Elder Co., Utah; at Candelaria, Mineral Co., and the Silver Coin mine, near Valmy, Iron Point district, Humboldt Co., Nevada; from Twin Creek, Island Park, Fremont Co., Idaho; at the Mauldin Mountain quarry, near Mt. Ida, Montgomery Co., Arkansas. On Malpelo Island, west of Buenaventura, Colombia. From the Gunheath china clay pit, five km north-northwest of St. Austell, Cornwall, England. At Palazuelo de las Arribas, Zamora, Spain.

Name: For the dimorphous relation with *variscite*.

Type Material: The Natural History Museum, London, England, 1912,618; National Museum of Natural History, Washington, D.C., USA, 87484, 87485, 87495, 86933.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 767–769. (2) Kniep, R. and D. Mootz (1973) Metavariscite - a redetermination of its crystal structure. Acta Cryst., 29, 2292–2294.