

Crystal Data: Orthorhombic (synthetic). *Point Group:* $2/m\ 2/m\ 2/m$. Small indistinct flat crystals.

Physical Properties: Hardness = n.d. $D(\text{meas.}) = \text{n.d.}$ $D(\text{calc.}) = 1.83$ Soluble in H_2O , forming a struvite residue.

Optical Properties: Transparent. *Color:* Colorless.

Optical Class: Biaxial (+) (synthetic). *Orientation:* $Z = a$; $\text{OAP} = \{001\}$. $\alpha = 1.508(2)$
 $\beta = 1.515(2)$ $\gamma = 1.523(2)$ $2V(\text{meas.}) = \sim 90^\circ$ $2V(\text{calc.}) = 86^\circ$

Cell Data: *Space Group:* $Pbca$ (probable; synthetic). $a = 11.47$ $b = 23.63$ $c = 8.62$
 $Z = 8$

X-ray Powder Pattern: Synthetic.

5.94 (100), 2.97 (43), 5.21 (37), 2.80 (29), 3.02 (22), 3.46 (21), 4.31 (19)

Chemistry:

| | (1) | (2) |
|---------------------------|--------|--------|
| P_2O_5 | 43.88 | 43.76 |
| FeO | 0.20 | |
| MnO | 0.05 | |
| MgO | 12.17 | 12.42 |
| $(\text{NH}_4)_2\text{O}$ | 16.15 | 16.05 |
| H_2O | 27.55 | 27.77 |
| Total | 100.00 | 100.00 |

(1) Skipton lava tube caves, Australia. (2) $(\text{NH}_4)_2\text{Mg}(\text{PO}_3\text{OH})_2 \cdot 4\text{H}_2\text{O}$.

Occurrence: Rarely formed in drier portions of bat guano, by the reaction of NH_4 from guano with Mg in surrounding rocks.

Association: Struvite, newberyite (Skipton lava tube caves, Australia).

Distribution: In the Skipton lava tube caves, 40 km southwest of Ballarat, Victoria, Australia. From Chaos Cave, Transvaal, South Africa.

Name: To honor Professor Arnulf Schertel (1841–1902), mineralogist, Freiberg Mining Academy, Freiberg, Germany.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 699. (2) Frazier, A.W., J.R. Lehr, and J.P. Smith (1963) The magnesium phosphates hannayite, schertelite and bobierite. *Amer. Mineral.*, 48, 635–641. (3) Catti, M. and M. Franchini-Angela (1976) Hydrogen bonding in the crystalline state. Structure of $\text{Mg}_3(\text{NH}_4)_2(\text{HPO}_4)_4 \cdot 4\text{H}_2\text{O}$ (hannayite), and crystal-chemical relationships with schertelite and struvite. *Acta Cryst.*, 32, 2842–2848.