

Struvite**(NH₄)Mg(PO₄)·6H₂O**

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Crystal Data: Orthorhombic. *Point Group:* *mm*2. Crystals are equant, wedgelike, short prismatic, or tabular, hemimorphic, with large {011}, {100}, {001}, {101}, { $\bar{1}$ 01}, {102}, several other forms, to 3 cm. *Twining:* On {001} as twin and composition plane, with deep re-entrants.

Physical Properties: *Cleavage:* {001}, good; {010}, poor. *Fracture:* Subconchoidal to uneven. Hardness = 2 D(meas.) = 1.711 D(calc.) = 1.706 Slightly soluble in H₂O, dehydrates in dry, warm air. Pyroelectric and piezoelectric.

Optical Properties: Transparent to translucent. *Color:* Colorless, may be tinted yellow or brown from impurities, and becomes surficially white on dehydration; colorless in transmitted light. *Luster:* Vitreous.

Optical Class: Biaxial (+). *Orientation:* X = b; Y = c; Z = a. *Dispersion:* r < v, strong. $\alpha = 1.495$ $\beta = 1.496$ $\gamma = 1.504$ 2V(meas.) = 37°22'

Cell Data: *Space Group:* *Pmn*2₁ (synthetic). a = 6.955(1) b = 6.142(1) c = 11.218(2) Z = 2

X-ray Powder Pattern: Synthetic.

4.257 (100), 5.601 (60), 2.919 (55), 2.690 (50), 2.660 (45), 5.905 (40), 4.139 (40)

Chemistry:

	(1)	(2)
P ₂ O ₅	28.82	28.92
FeO	0.81	
MnO	0.16	
MgO	16.07	16.42
(NH ₄) ₂ O	10.57	10.61
H ₂ O	43.57	44.05
Total	100.00	100.00

(1) Skipton lava tube caves, Australia. (2) (NH₄)Mg(PO₄)·6H₂O.

Occurrence: In peaty earth intermixed with cattle dung (Hamburg, Germany); typically formed in bird or bat guano in caves and surface deposits.

Association: Newberyite, hannayite, brushite, stercorite.

Distribution: Found under St. Nikolai Church, Hamburg, Germany. From an archaeological excavation at High Street and Fishamble Street, Dublin, Ireland. At the Limfjord, Denmark. In the Niah Great Cave, Sarawak, Malaysia. From Saldanha Bay, Cape Province, and Ficus and Boon's Caves, Transvaal, South Africa. On Ichaboe Island, northwest of Lüderitz, Namibia. From Gcwihaba Cave, 280 km west of Maun, northwestern Botswana. On Réunion Island, Indian Ocean; the Bounty Islands, South Pacific Ocean; King Georges Island, Maritime Antarctic. In the Skipton lava tube caves, 40 km south of Ballarat, Victoria, Australia. In the USA, on Paoha Island, Mono Lake, Mono Co., California.

Name: To honor Heinrich Christoph Gottfried Struve (1772–1851), German mineral collector, serving as Russian Consul at Hamburg, Germany when the mineral was discovered.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 715–717. (2) Ferraris, G., H. Fuess, and W. Joswig (1986) Neutron diffraction study of MgNH₄PO₄·6H₂O (struvite) and survey of water molecules donating short hydrogen bonds. *Acta Cryst.*, 42, 253–258. (3) (1964) NBS Mono. 25, 3, 41.