

Crystal Data: Tetragonal. *Point Group:* $\bar{4}2m$. Elongated pyramidal crystals, to 3 mm, in massive groupings, crusts, and crystalline stalagmites.

Physical Properties: Hardness = n.d. D(meas.) = 1.33(1) D(calc.) = [1.33] Soluble in H₂O.

Optical Properties: Semitransparent. *Color:* Pale yellow to pale brown.
Optical Class: Uniaxial (+). $\omega = 1.484$ $\epsilon = 1.601$

Cell Data: *Space Group:* $P\bar{4}2_1m$. $a = 5.646(1)$ $c = 4.701(1)$ $Z = [2]$

X-ray Powder Pattern: Toppin Hill, Western Australia.
3.98 (10), 3.04 (3), 3.61 (2), 2.552 (1b), 2.172 (1), 1.837 (1), 4.70 (< 1)

Chemistry:	(1)
	CO(NH ₂) ₂ 96.
	NH ₃ < 1.0
	P 0.24
	S 0.11
	Ca 0.07
	Mg 0.03
	Na 0.13
	K 0.35
	H ₂ O ⁻ 0.46
	<hr/> Total < 98.39

(1) Toppin Hill, Western Australia; by urease reduction, remainder probably mostly H₂O⁺.

Occurrence: Derived from bat guano and urine, stable only under very arid conditions.

Association: Ammonian apthitalite, weddellite, phosphammite.

Distribution: In Australia, from Toppin Hill, near Lake Rason, about 320 km northeast of Kalgoorlie, and in Wilgie Mia Cave, Western Australia.

Name: From the Greek for *urine*, in which urea was first found.

Type Material: Western Australia Museum, Perth, Australia, S4688.

References: (1) Bridge, P.J. (1973) Urea, a new mineral, and neotype phosphammite from Western Australia. *Mineral. Mag.*, 39, 346–348. (2) (1974) *Amer. Mineral.*, 59, 874 (abs. ref. 1). (3) Swaminathan, S., B.M. Craven, and R.K. McMullan (1984) The crystal structure and molecular thermal motion of urea at 12, 60 and 123 K from neutron diffraction. *Acta Cryst.*, 40, 300–306.