Urea $CO(NH_2)_2$

Crystal Data: Tetragonal. *Point Group:* $\overline{4}2m$. 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 H_2O.

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

Cell Data: *Space Group:* $P\overline{4}2_1m$. $a = 5.646(1)$ $c = 4.701(1)$ 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_2O^-	0.46
Total	< 98.39

(1) Toppin Hill, Western Australia; by urease reduction, remainder probably mostly H_2O^+.

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

Association: Ammonian aphthitalite, 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.