

Ulrichite

CaCu(UO₂)(PO₄)₂·4H₂O

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Crystal Data: Monoclinic. *Point Group:* 2/m. As crystals, composed of flat prismatic fibers with complex terminations, to 1 mm, in radial aggregates. *Twining:* On {100}, common.

Physical Properties: Hardness = ~3.5 D(meas.) = n.d. D(calc.) = 3.71 Radioactive.

Optical Properties: Transparent to translucent. *Color:* Pale apple-green to lime-green; in transmitted light, pale green. *Streak:* White. *Luster:* Vitreous.

Optical Class: Biaxial (-) (?). *Orientation:* Parallel extinction, length slow. $\alpha = 1.622(2)$
 $\beta = \text{n.d.}$ $\gamma = 1.634(2)$ 2V(meas.) = n.d.

Cell Data: *Space Group:* C2/m. $a = 12.79(3)$ $b = 6.85(2)$ $c = 13.02(3)$ $\beta = 91.03(7)^\circ$
Z = 4

X-ray Powder Pattern: Lake Boga quarry, Australia.

6.389 (100), 3.193 (45), 2.879 (20), 4.498 (15), 2.373 (15), 5.602 (14), 3.480 (14)

Chemistry:

	(1)	(2)
UO ₃	46.36	45.00
P ₂ O ₅	22.09	22.33
CuO	11.02	12.51
CaO	9.23	8.82
H ₂ O	9.9	11.34
Total	98.60	100.00

(1) Lake Boga quarry, Australia; by electron microprobe, average of 14 analyses, H₂O by CHN analyzer on a separate sample; corresponds to Ca_{1.09}Cu_{0.92}(UO₂)_{1.07}(PO₄)_{2.06}·3.65H₂O.

(2) CaCu(UO₂)(PO₄)₂·4H₂O.

Occurrence: A secondary mineral in miarolitic cavities in pegmatoidal granite.

Association: Turquoise-chalcosiderite, cyrilovite, torbernite, libethenite, sampleite, saléeite, fluorapatite.

Distribution: From the Lake Boga granite quarry, near Swan Hill, Victoria, Australia.

Name: To honor George Henry Frederick Ulrich (1830–1900), for his contributions to the mineralogy of Victoria, Australia.

Type Material: Museum Victoria, Melbourne, Australia, M38576.

References: (1) Birch, W.D., W.G. Mumme, and E.R. Segnit (1988) Ulrichite: a new copper calcium uranium phosphate from Lake Boga, Victoria, Australia. *Australian Mineral.*, 3, 125–131.

(2) (1990) *Amer. Mineral.*, 75, 243 (abs. ref. 1).