

Crystal Data: Monoclinic. *Point Group:* 2/m. As acicular to lath-like microcrystals forming compact to slightly open spheres, hemispheres, and flattened sprays to ~0.25 mm, with individual fibers to 30 μm.

Physical Properties: *Cleavage:* One || [001], possible. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = 3 (by analogy in the group) D(meas.) = n.d. D(calc.) = 3.063

Optical Properties: Transparent. *Color:* Yellow-green. *Streak:* Pale yellow. *Luster:* Silky (aggregates).

Optical Class: Biaxial (-). $a = 1.703(3)$ $\beta = 1.742(4)$ $\gamma = 1.762(3)$ $2V(\text{calc.}) = 70^\circ$

Orientation: $Z \approx c$. *Pleochroism:* Slight, $X =$ very pale yellow (almost colorless), $Y =$ pale yellowish, $Z =$ yellowish. *Absorption:* $Z > Y > X$. Length slow. *Dispersion:* Weak.

Cell Data: *Space Group:* P2/c. $a = 9.863(10)$ $b = 9.661(6)$ $c = 5.476(6)$ $\beta = 92.45(3)^\circ$ $Z = 2$

X-Ray Diffraction Pattern: Near Lake Boga, northern Victoria, Australia.

9.849 (100), 4.386 (90), 6.892 (80), 4.924 (80), 2.697 (60), 4.333 (45), 4.225 (35)

Chemistry:	(1)	(2)
CuO	16.08	16.88
ZnO	0.03	
CaO	0.05	
Fe ₂ O ₃	27.56	33.88
Al ₂ O ₃	0.56	
P ₂ O ₅	22.96	30.12
As ₂ O ₅	5.14	
H ₂ O	[16.61]	19.12
Total	88.99	100.00

(1) Near Lake Boga, northern Victoria, Australia; average electron microprobe analysis supplemented by Raman spectroscopy, H₂O calculated for charge balance.

(2) CuFe₂(PO₄)₂(OH)₂·4H₂O.

Mineral Group: Whitmoreite group.

Occurrence: Secondary along fractures and in vugs deposited from circulating groundwaters charged with P, U and Cu that were derived from oxidation of primary fluorapatite in granite.

Association: Chalcosiderite-turquoise, libethenite, pseudomalachite (Lake Boga); isokite, triplite, chalcosiderite-turquoise, leucophosphate, pharmacosiderite, whitmoreite, earlshannonite, kolbeckite (Huber mine).

Distribution: From near Lake Boga, northern Victoria, Australia [TL]. At the Huber mine, near Krasno, Czech Republic.

Name: From the Australian aboriginal words *kunat kunat*, meaning 'cotton weed', a species that grows in the region around Lake Boga where studied samples were collected.

Type Material: Museum Victoria, Melbourne, Australia (M40728 and M43772).

References: (1) Mills, S.J., U. Kolitsch, W.D. Birch, and J. Sejkora (2008) Kunatite, CuFe₂(PO₄)₂(OH)₂·4H₂O, a new member of the whitmoreite group, from Lake Boga, Victoria, Australia. *Australian J. Mineral.*, 14, 3-12. (2) Sejkora, J., R. Škoda, and P. Ondruš (2006) New naturally occurring mineral phases from the Krásno-Horní Slavkov area, western Bohemia, Czech Republic. *J. Czech Geol. Soc.*, 51, 159-187.