

Upalite**Al(UO₂)₃O(PO₄)₂(OH)·7H₂O**

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Crystal Data: Monoclinic, pseudo-orthorhombic. *Point Group:* 2/m. Acicular to fibrous crystals, elongated along [001], poorly terminated, to 0.3 mm. *Twinning:* By reflection on {001}, universal.

Physical Properties: *Cleavage:* On {010}, distinct. Hardness = 3 D(meas.) = 3.9(1) D(calc.) = 3.94 Radioactive.

Optical Properties: Transparent. *Color:* Amber-yellow; canary-yellow in transmitted light. *Optical Class:* Biaxial (-). *Pleochroism:* Strong; X = colorless; Y = Z = canary-yellow. *Orientation:* X = b; Y = a; Z = c. *Orientation:* Negative elongation. $\alpha = 1.649$ $\beta = 1.666$ $\gamma = 1.676$ 2V(meas.) = n.d. 2V(calc.) = 74(9)°

Cell Data: *Space Group:* P2₁/a. a = 13.704(4) b = 16.82(1) c = 9.332(2) $\beta = 111.5(1)^\circ$ Z = 4

X-ray Powder Pattern: Kobokobo pegmatite, Congo. 8.4 (100), 4.18 (80), 3.43 (80), 2.903 (75), 3.17 (70), 3.084 (70), 4.24 (60)

Chemistry:	(1)	(2)
UO ₃	80.2	72.34
P ₂ O ₅	12.3	11.97
Al ₂ O ₃	4.0	4.30
H ₂ O	[3.5]	11.39
Total	[100.0]	100.00

(1) Kobokobo pegmatite, Congo; by electron microprobe, H₂O by difference.

(2) Al(UO₂)₃O(PO₄)₂(OH)·7H₂O.

Occurrence: A rare secondary mineral in the oxidized uraniferous zone of a complex granite pegmatite.

Association: Meta-autunite, phosphuranylite, threadgoldite, phuralumite.

Distribution: From the Kobokobo pegmatite, Lusungu River district, Kivu Province, Congo (Zaire).

Name: For Uranium, Phosphorus, and ALuminum in the composition.

Type Material: Royal Museum of Central Africa, Tervuren, Belgium, RMG5951, RMG13457, RMG11888.

References: (1) Deliens, M. and P. Piret (1979) Les phosphates d'uranyle et d'aluminium de Kobokobo. II. La phuralumite Al₂(UO₂)₃(PO₄)₂(OH)₆·10H₂O et l'upalite Al(UO₂)₃(PO₄)₂(OH)₃, nouveaux minéraux. Bull. Minéral., 102, 333-337 (in French with English abs.). (2) (1980) Amer. Mineral., 65, 208 (abs. ref. 1). (3) Piret, P. and J.-P. Declercq (1983) Structure cristalline de l'upalite Al[(UO₂)₃O(OH)(PO₄)₂]·7H₂O. Un exemple de macle mimétique. Bull. Minéral., 106, 383-389 (in French with English abs.).