Kingite $Al_3(PO_4)_2(OH,F)_3 \cdot 9H_2O$

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Crystal Data: Triclinic. *Point Group:* $\overline{1}$ or 1. As platelets or irregular fragments, to 1 μm, aggregated in nodules; as crusts of intergrown spheroids resembling fish roe.

Physical Properties: Hardness = n.d. D(meas.) = 2.21–2.30 D(calc.) = 2.465

Optical Properties: Translucent. *Color:* White, colorless, greenish yellow. *Luster:* Vitreous to dull.
Optical Class: Biaxial. $n = 1.514$

Cell Data: *Space Group:* $P\overline{1}$ or $P1$. $a = 9.15(1)$ $b = 10.00(1)$ $c = 7.24(2)$
$\alpha = 98.6(1)^\circ$ $\beta = 93.6(1)^\circ$ $\gamma = 93.2(1)^\circ$ Z = 2

X-ray Powder Pattern: Near Robertstown, Australia.
9.1 (100), 3.45 (80), 3.48 (65), 5.28 (52), 3.17 (39), 3.108 (30), 5.43 (28)

Chemistry:

	(1)	(2)
P_2O_5	28.93	29.20
Al_2O_3	32.25	31.47
F	0.85	3.91
H_2O^+	38.32	37.07
$-O = F_2$	0.35	1.65
Total	[100.00]	100.00

(1) Near Robertstown, Australia; after deduction of Na 0.47% and Cl as halite impurity.
(2) $Al_3(PO_4)_2(OH)_2F \cdot 9H_2O$.

Occurrence: Of secondary origin, precipitated in fractured rock by meteoric water.

Association: Halite, talc, quartz, "limonite" (near Robertstown, Australia); "opal", sanidine (Wilson Springs mine, Arkansas, USA).

Distribution: In Australia, from the Fairview phosphate quarry, about 21 km north of Robertstown, in a quarry near Clinton, and at Tom's quarry, near Kapunda, South Australia. In the USA, from the Wilson Springs (Potash Sulphur Springs) mine, Garland Co., Arkansas; in the Gold Quarry mine, near Carlin, Maggie Creek district, Eureka Co., Nevada. In Germany, in the Weckersdorf quarry, near Schleitz, and Ronneburg, Thuringia.

Name: Honors Mr. D. King (1926–1990), geologist, Department of Mines, Adelaide, South Australia, who collected the first specimens.

Type Material: Natural History Museum, Paris, France, 175.300; Harvard University, Cambridge, Massachusetts, 109441; National Museum of Natural History, Washington, D.C., USA, 112693.

References: (1) Norrish, K., L.E.R. Rogers, and R.E. Shapter (1957) Kingite, a new hydrated aluminum phosphate mineral from Robertstown, South Australia. Mineral. Mag., 31, 351–357. (2) (1957) Amer. Mineral., 42, 580–581 (abs. ref. 1). (3) Kato, T. (1970) Cell dimensions of the hydrated phosphate, kingite. Amer. Mineral., 55, 515–517. (4) Howard, J.M. and D.R. Owens (1995) Minerals of the Wilson Springs vanadium mines, Potash Sulphur Springs, Arkansas. Rocks & Minerals, 70(3), 154–170.

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