

Kingsmountite $(\text{Ca}, \text{Mn}^{2+})_4(\text{Fe}^{2+}, \text{Mn}^{2+})\text{Al}_4(\text{PO}_4)_6(\text{OH})_4 \cdot 12\text{H}_2\text{O}$

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Crystal Data: Monoclinic. *Point Group:* 2 (probable). As imperfect bladed crystals, usually in radial hemispherical aggregates, to 2 mm.

Physical Properties: Hardness = ~ 2.5 $D(\text{meas.}) = 2.51(3)$ $D(\text{calc.}) = 2.58$

Optical Properties: Translucent. *Color:* White to very pale brown. *Streak:* White. *Luster:* Pearly to fibrous.

Optical Class: Biaxial (-). *Orientation:* $Y \perp$ lath flattening; X and $Z \parallel$ lath flattening; $Z \wedge$ lath length = $35(5)^\circ$. $\alpha = 1.573(3)$ $\beta = 1.581(3)$ $\gamma = 1.583(3)$ $2V(\text{meas.}) = 62(5)^\circ$

Cell Data: *Space Group:* $[C2]$ (by analogy to montgomeryite). $a = 10.029(6)$ $b = 24.46(1)$ $c = 6.258(4)$ $\beta = 91.16(7)^\circ$ $Z = 2$

X-ray Powder Pattern: Foote mine, North Carolina, USA.

5.15 (100), 2.624 (60), 12.23 (50), 2.950 (40), 6.33 (30), 3.31 (30), 2.915 (30)

Chemistry:

	(1)
P_2O_5	35.9
Al_2O_3	16.7
FeO	4.1
MnO	8.1
MgO	0.2
CaO	14.9
H_2O	20.6
Total	100.5

(1) Foote mine, North Carolina, USA; by electron microprobe, average of three analyses, total Fe as FeO, total Mn as MnO, H_2O by DTA/TGA, Mn^{2+} assigned to fill Ca deficiency and Fe^{3+} calculated to fill Al deficiency; then corresponding to $(\text{Ca}_{3.15}\text{Mn}_{0.85})_{\Sigma=4.00}(\text{Fe}_{0.56}^{2+}\text{Mn}_{0.50}^{2+}\text{Mg}_{0.06})_{\Sigma=1.12}(\text{Al}_{3.88}\text{Fe}_{0.12}^{3+})_{\Sigma=4.00}(\text{PO}_4)_{6.00}(\text{OH})_4 \cdot 11.6\text{H}_2\text{O}$.

Mineral Group: Montgomeryite group.

Occurrence: A secondary mineral formed from alteration of primary phosphates by descending oxidizing ground water in complex granite pegmatites.

Association: Mitridatite, birnessite (Foote mine, North Carolina, USA); whitlockite, cyrilovite (Tip Top mine, South Dakota, USA); eosphorite, laueite, lun'okite, fairfieldite, mitridatite (Mt. Vasin-Myl'k, Russia).

Distribution: In the USA, at the Foote mine, near Kings Mountain, Cleveland Co., North Carolina; from the Tip Top mine, 8.5 km southwest of Custer, Custer Co., South Dakota; in the Twin Creeks mine, Potosi district, Humboldt Co., Nevada. On Mt. Vasin-Myl'k, Voron'i massif, Kola Peninsula, Russia. In the Bendada pegmatite, near Guarda, Portugal. From the Silbergrube quarry, near Waidhaus, and at Hagendorf, Bavaria, Germany.

Name: For the town, KINGS MOUNTain, North Carolina, USA, near which the mineral was first collected.

Type Material: National Museum of Natural History, Washington, D.C., USA, 120972, 120973.

References: (1) Dunn, P.J., D.R. Peacor, J.S. White, and R.A. Ramik (1979) Kingsmountite, a new mineral isostructural with montgomeryite. *Can. Mineral.*, 17, 579–582. (2) (1981) *Amer. Mineral.*, 66, 1275–1276 (abs. ref. 1).