Boromuscovite \(\text{KA}_2\text{(Si}_3\text{B)O}_{10}(\text{OH, F})_2\]

**Crystal Data:** Monoclinic. **Point Group:** 2/m. Pseudohexagonal crystals, to 4 \(\mu\)m, aggregated in coatings on other minerals.

**Physical Properties:** **Cleavage:** Perfect on \{001\}; poor \{010\} parting. **Fracture:** Subconchoidal. Hardness = 2.5–3 in aggregate. D(meas.) = 2.81 (on a mixture). D(calc.) = 2.89 (2M\(_1\); 2.90 (1M).

**Optical Properties:** Nearly opaque. **Color:** White to buff or pale cream. **Streak:** White. **Luster:** Dull, earthy to porcelaneous. **Optical Class:** Biaxial (\(\epsilon\)). **Orientation:** \(X^c = -1^\circ\); \(Y^a = 2^\circ\); \(Z = b\). **Dispersion:** \(r > v\), weak. \(\alpha = 1.557(2)\) \(\beta = 1.587(2)\) \(\gamma = 1.593(2)\) 2V(meas.) = 44(2)° 2V(calc.) = 47.5°

**Cell Data:** **Space Group:** [C2/c] (2M\(_1\) polytype by analogy to muscovite). \(a = 5.075(1)\) \(b = 8.794(4)\) \(c = 19.815(2)\) \(\beta = 95.59(3)°\) \(Z = [2]\), or **Space Group:** [C2/c] (1M polytype by analogy to muscovite). \(a = 5.077(1)\) \(b = 8.775(3)\) \(c = 10.061(2)\) \(\beta = 101.31(2)°\) \(Z = [4]\)

**X-ray Powder Pattern:** Little Three mine, California, USA.

3.569 (100), 4.391 (80), 3.008 (80), 2.505 (80), 9.862 (60), 4.239 (40), 4.007 (40)

**Chemistry:**

\[
\begin{array}{ccc}
\text{SiO}_2 & 48.1 & \text{Na}_2\text{O} < 0.05 \\
\text{TiO}_2 & < 0.01 & \text{K}_2\text{O} 11.0 \\
\text{B}_2\text{O}_3 & 7.0 & \text{Rb}_2\text{O} 0.52 \\
\text{Al}_2\text{O}_3 & 28.1 & \text{Cs}_2\text{O} 0.05 \\
\text{Fe}_2\text{O}_3 & 0.1 & \text{F} 0.76 \\
\text{MnO} & 0.08 & \text{H}_2\text{O}^+ 4.55 \\
\text{MgO} & 0.15 & \text{H}_2\text{O}^- 0.22 \\
\text{CaO} & 0.1 & \text{P}_2\text{O}_5 < 0.05 \\
\text{Li}_2\text{O} & 0.05 & \text{O} = \text{F}_2 0.32 \\
\end{array}
\]

Total 100.46

(1) Little Three mine, California, USA; by a combination of electron microprobe, XRF, AA, and ICP-atomic emission spectroscopy; corresponding to (K\(_{0.89}\)Rb\(_{0.02}\)Ca\(_{0.01}\))\(\Sigma = 0.92\) (Al\(_{1.93}\)Li\(_{0.01}\)Mg\(_{0.01}\))\(\Sigma = 1.95\) (Si\(_{3.06}\)P\(_{0.77}\)Al\(_{0.17}\))\(\Sigma = 4.00\) O\(_{9.82}\) ([OH]\(_{2.02}\)F\(_{0.16}\))\(\Sigma = 2.18\).

**Polymorphism & Series:** 2M\(_1\), 1M polytypes.

**Mineral Group:** Mica group.

**Occurrence:** A coating on other minerals on the floor of a pegmatite pocket, hydrothermally deposited after rupture of the pocket.

**Association:** Lepidolite, quartz, microcline, topaz.

**Distribution:** From the Little Three mine, Ramona district, San Diego Co., California, USA.

**Name:** Presumably for the BOROn content and relation to muscovite.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 166821.


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