Franklinphilite

\[
(K, Na)_4(Mn^{2+}, Mg, Zn)_{48} (Si, Al)_{72}(O, OH)_{216} \cdot 6H_2O
\]

Crystal Data: Triclinic, pseudohexagonal. **Point Group**: 1 or \( \overline{1} \). Platy crystals, to 0.5 mm, in very fine-grained tangled radial aggregates.

**Physical Properties:** Cleftage: Imperfect on \{001\}. Tenacity: Brittle. Hardness = 4

D(meas.) = 2.6–2.8 D(calc.) = 2.66

**Optical Properties:** Translucent to nearly opaque; transparent to translucent in thin section. Color: Very dark brown to black. Streak: Light brown. Luster: Vitreous to slightly resinous.

**Orientation:** \( X \wedge (001) \approx 6^\circ \). \( \alpha = 1.545(5) \) \( \beta = 1.583(3) \) \( \gamma = 1.583(3) \) 2V(meas.) = 10(3)° 2V(calc.) = 0°

**Cell Data:** Space Group: \( P1 \) or \( P\overline{1} \), orthohexagonal cell is \( a = 5.521(4) \) \( b = 9.560(6) \) \( c = 36.57(5) \) \( Z = 3/8 \)

**X-ray Powder Pattern:** Franklin, New Jersey, USA. 12.3 (100), 2.583 (40), 2.737 (30), 2.362 (30), 1.594 (30), 1.580 (30), 4.79 (20)

**Chemistry:**

\[
\begin{align*}
\text{SiO}_2 & \quad 44.0 \\
\text{Al}_2\text{O}_3 & \quad 3.6 \\
\text{Fe}_2\text{O}_3 & \quad 7.8 \\
\text{MnO} & \quad 22.3 \\
\text{MgO} & \quad 6.4 \\
\text{ZnO} & \quad 5.9 \\
\text{Na}_2\text{O} & \quad 0.4 \\
\text{K}_2\text{O} & \quad 1.5 \\
\text{H}_2\text{O} & \quad [8.1] \\
\text{Total} & \quad [100.0]
\end{align*}
\]

(1) Franklin, New Jersey, USA.; by electron microprobe, \( H_2O \) by difference, corresponding to \( (K_{2.6}Na_{1.1})_{12} (Mn_{2.6}Mg_{13.2}Zn_{6.6}Fe_{2.7})_{12} (Si_{60.8}Al_{5.8}Fe_{3(4)}^{3+})_{12} O_{163.2} (OH)_{52.8} \) \( \Sigma = 216.0 \) \( nH_2O \).

**Polymorphism & Series:** Forms a series with lennilenapeite.

**Occurrence:** In a veinlet crosscutting a breccia of calcite, aegirine, and serpentine in a metamorphosed stratiform zinc deposit.

**Association:** Friedelite, nelenite, rhodonite, tirodite.

**Distribution:** At Franklin, Sussex Co., New Jersey, USA.

**Name:** From the locality Franklin, New Jersey, USA, and the Greek for friend, for the association of elements characteristic of Franklin.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 167390.