

**Franklinfurnaceite**

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**Crystal Data:** Monoclinic. *Point Group:* 2. As very thin, platy crystals, tabular on {001}, to 0.3 mm, with dominant {001} showing serrated edges; as polycrystalline aggregates of subparallel individuals.

**Physical Properties:** *Cleavage:* Perfect on {001}. *Tenacity:* Extremely brittle. Hardness = 3 D(meas.) = 3.66 D(calc.) = 3.737

**Optical Properties:** Translucent. *Color:* Dark brown; in thin section, brown to very dark brown. *Streak:* Brown. *Luster:* Vitreous.

*Optical Class:* Biaxial (-). *Pleochroism:* Intense; X = very dark brown; Y = brown; Z = deep brown. *Orientation:* Z = b; Y  $\wedge$  c = 29°. *Dispersion:* r < v, moderate. *Absorption:* Strong; X  $\gg$  Z > Y.  $\alpha = 1.792(4)$   $\beta = 1.798(4)$   $\gamma = 1.802(4)$  2V(meas.) = 79° 2V(calc.) = 78.5°

**Cell Data:** *Space Group:* C2. a = 5.483(7) b = 9.39(3) c = 14.51(1)  $\beta = 97.04(8)^\circ$  Z = 2

**X-ray Powder Pattern:** Franklin, New Jersey, USA.

2.305 (100), 2.707 (80b), 2.602 (70b), 14.4 (50), 3.35 (50), 3.60 (40), 3.20 (40)

**Chemistry:**

	(1)	(2)
SiO <sub>2</sub>	14.5	15.0
Al <sub>2</sub> O <sub>3</sub>	0.8	0.4
Fe <sub>2</sub> O <sub>3</sub>	9.4	9.3
Mn <sub>2</sub> O <sub>3</sub>	9.5	10.6
MnO	17.0	19.0
ZnO	22.7	24.1
MgO	3.6	0.6
CaO	14.3	12.6
H <sub>2</sub> O	[8.2]	8.4
Total	[100.0]	100.0

(1) Franklin, New Jersey, USA; by electron microprobe, Fe<sub>2</sub>O<sub>3</sub> shown present by microchemical tests, Mn<sup>2+</sup>:Mn<sup>3+</sup> from crystal structure, H<sub>2</sub>O by difference; corresponds to Ca<sub>2</sub>(Fe<sub>0.76</sub><sup>3+</sup>Al<sub>0.24</sub>)<sub>Σ=1.00</sub>(Mn<sub>0.97</sub><sup>3+</sup>Mg<sub>0.03</sub>)<sub>Σ=1.00</sub>(Mn<sub>0.54</sub><sup>2+</sup>Mg<sub>0.28</sub>Zn<sub>0.18</sub>)<sub>Σ=2.00</sub>Zn<sub>2</sub>Si<sub>2</sub>O<sub>10</sub>(OH)<sub>8</sub>.

(2) Do; H<sub>2</sub>O by TGA, corresponds to Ca<sub>1.88</sub>(Fe<sub>0.97</sub><sup>3+</sup>Al<sub>0.06</sub>)<sub>Σ=1.03</sub>Mn<sub>1.12</sub><sup>3+</sup>Mn<sub>2.24</sub><sup>2+</sup>Mg<sub>0.12</sub>Zn<sub>2.47</sub>Si<sub>2.08</sub>O<sub>10.22</sub>(OH)<sub>7.78</sub>.

**Occurrence:** A late-stage mineral in vugs in a metamorphosed stratiform zinc deposit.

**Association:** Willemite, clinohedrite, hodgkinsonite, hetaerolite, franklinite, barite, rhodonite.

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

**Name:** After Franklin Furnace, the former name for Franklin, New Jersey, USA.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, C6309, R19144.

**References:** (1) Dunn, P.J., D.R. Peacor, R.A. Ramik, S.-C. Su, and R.C. Rouse (1987) Franklinfurnaceite, a Ca-Fe<sup>3+</sup>-Mn<sup>3+</sup>-Mn<sup>2+</sup> zincosilicate isotypic with chlorite, from Franklin, New Jersey. *Amer. Mineral.*, 72, 812-815. (2) Peacor, D.R., R.C. Rouse, and S.W. Bailey (1988) Crystal structure of franklinfurnaceite: a tri-dioctahedral zincosilicate intermediate between chlorite and mica. *Amer. Mineral.*, 73, 876-887.