

Fairfieldite**Ca₂(Mn²⁺, Fe²⁺)(PO₄)₂·2H₂O**

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. Prismatic to equant crystals, to 2.8 cm, showing {001}, {010}, {100}, {1 $\bar{1}$ 0}, { $\bar{1}\bar{1}$ 1}. Commonly in foliated to lamellar aggregates, may be curved; radiating, fibrous.

Physical Properties: *Cleavage:* {001}, perfect; {010}, good; {1 $\bar{1}$ 0}, distinct.
Fracture: Uneven. *Tenacity:* Brittle. *Hardness* = 3.5 *D*(meas.) = 3.08–3.11 *D*(calc.) = 3.095

Optical Properties: Transparent. *Color:* White, greenish white, pale straw-yellow, salmon-yellow; colorless in transmitted light. *Streak:* White. *Luster:* Pearly to subadamantine, vitreous on the {001} cleavage.

Optical Class: Biaxial (+). *Orientation:* *X* (120°, 60°); *Y* (–102°, 36°); *Z* (18°, 69°) using (ϕ, ρ). *Dispersion:* $r > v$, moderate. $\alpha = 1.633\text{--}1.640$ $\beta = 1.641\text{--}1.650$ $\gamma = 1.652\text{--}1.660$ $2V$ (meas.) = 86(1)°

Cell Data: *Space Group:* $P\bar{1}$. $a = 5.79$ $b = 6.57$ $c = 5.51$ $\alpha = 102^\circ 16'$ $\beta = 108^\circ 40'$ $\gamma = 90^\circ 18'$ $Z = 1$

X-ray Powder Pattern: Buckfield, Maine, USA.
3.23 (10), 6.40 (9), 3.03 (8), 3.20 (7), 2.86 (7), 2.66 (7), 2.63 (7)

Chemistry:	(1)	(2)	(3)
P ₂ O ₅	38.39	37.79	39.26
FeO	5.62	1.00	9.94
MnO	15.55	19.68	9.81
CaO	28.85	29.77	31.02
Na ₂ O	0.73		
K ₂ O	0.13		
H ₂ O	9.98	9.94	9.97
insol.	1.31	1.07	
Total	100.56	99.25	100.00

(1) Branchville, Connecticut, USA. (2) Buckfield, Maine, USA. (3) Ca₂(Mn, Fe)(PO₄)₂·2H₂O with Mn:Fe = 1:1.

Mineral Group: Fairfieldite group.

Occurrence: An accessory mineral in granite pegmatites.

Association: Apatite, strunzite, diadochite, dickinsonite, stewartite, rockbridgeite, mitridatite, eosphorite, a host of other Fe–Mn phosphates, jahnsite, rhodochrosite, quartz, muscovite.

Distribution: In the USA, from Branchville, Fairfield Co., Connecticut; in Maine, in Oxford Co., as large crystals at the Bennett quarry, Buckfield, in the Nevel quarry and elsewhere around Newry, from the Emmons quarry, Greenwood, and from the Berry quarry, Poland, Androscoggin Co.; fine examples from the Foote mine, Kings Mountain, Cleveland Co., North Carolina; in the Tip Top mine, 8.5 km southwest of Custer, and the Bull Moose mine, five km southeast of Custer, Custer Co., South Dakota; from the White Picacho district, Maricopa and Yavapai Cos., Arizona. At Hagendorf, and Hühnerkobel, near Zwiesel, Bavaria, Germany. From the Mangualde pegmatite, near Mesquitela, Portugal. In the Cerdanya basin, east to southwest of Bellver, Lerida Province, Spain. From the Voron'i massif, Kola Peninsula, Russia.

Name: For Fairfield Co., Connecticut, USA, within which is Branchville, the original locality.

Type Material: Yale University, New Haven, Connecticut, USA, 3.3118, 3.3123.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 720–722. (2) Frondel, C. (1955) Neomesselite and beta-roselite: two new members of the fairfieldite group. *Amer. Mineral.*, 40, 828–833. (3) Fanfani, L., A. Nunzi, and P.F. Zanazzi (1970) The crystal structure of fairfieldite. *Acta Cryst.*, 26, 640–645.

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