

**Gjerdingenite-Fe****K<sub>2</sub>Fe(Nb, Ti)<sub>4</sub>(Si<sub>4</sub>O<sub>12</sub>)<sub>2</sub>(O, OH)<sub>4</sub>·6H<sub>2</sub>O**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As pseudo-orthorhombic tabular, lathlike or prismatic crystals to 1 mm, as aggregates to 3 mm. Crystals are elongate along [010] and flattened on {001} showing dominant {100}, {001}. *Twinning:* On {001} from structure analysis.

**Physical Properties:** *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5  
D(meas.) = 2.82(2) D(calc.) = 2.830

**Optical Properties:** Translucent to transparent. *Color:* Pale yellow, brownish yellow, orange-yellow. *Streak:* White to faint yellow. *Luster:* Vitreous to waxy.

*Optical Class:* Biaxial (+).  $\alpha = 1.6676(2)$   $\beta = 1.7001(4)$   $\gamma = 1.794(1)$   $2V(\text{meas.}) = 58.5^\circ$   
 $2V(\text{calc.}) = 63.7^\circ$  *Orientation:*  $Y = b$ . Nonpleochroic.

**Cell Data:** *Space Group:* C2/m.  $a = 14.54(1)$   $b = 13.941(7)$   $c = 7.844(4)$   $\beta = 117.59(4)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Near Lake Gjerdingen, Gjerdingselva, Lunner, Oppland, Norway.  
3.225 (100), 6.92 (80), 3.114 (80), 4.94 (70), 6.42 (50), 2.512 (50), 3.069 (20)

Chemistry:	(1)	(2)
Na <sub>2</sub> O	0.69	0.93
K <sub>2</sub> O	6.03	7.54
CaO	0.05	0.09
MnO	2.90	2.22
FeO	4.31	3.45
Al <sub>2</sub> O <sub>3</sub>	0.37	0.21
SiO <sub>2</sub>	36.00	39.84
TiO <sub>2</sub>	9.75	11.49
ZrO <sub>2</sub>	0.32	0.26
Nb <sub>2</sub> O <sub>5</sub>	23.97	23.84
H <sub>2</sub> O	n.d.	10.13
Total	84.39	100.00

(1) Near Lake Gjerdingen, Gjerdingselva, Lunner, Oppland, Norway; average of 4 electron microprobe analyses, presence of H<sub>2</sub>O confirmed by IR and structure analyses.

(2)  $\{[(\text{H}_2\text{O})_{2.08}\text{K}_{1.20}\text{Na}_{0.72}]_{\Sigma=4}[\text{K}_{2.08}(\text{H}_2\text{O})_{1.92}]_{\Sigma=4}\}[(\text{H}_2\text{O})_{3.40}\text{K}_{0.56}\text{Ca}_{0.04}]_{\Sigma=4}(\text{Fe}_{0.95}\text{Mn}_{0.75}\square_{0.30})_{\Sigma=2}$   
 $(\text{Nb}_{4.30}\text{Ti}_{3.45}\text{Fe}_{0.20}\text{Zr}_{0.05})_{\Sigma=8}(\text{Si}_{15.90}\text{Al}_{0.10})_{\Sigma=16}\text{O}_{48}[(\text{OH})_{4.16}\text{O}_{3.84}]_{\Sigma=8}\cdot 4\text{H}_2\text{O}$ .

**Mineral Group:** Labuntsovite group, kuzmenkoite subgroup.

**Occurrence:** In miarolitic cavities in a sodic granite.

**Association:** Quartz, orthoclase, albite, aegirine, kupletskite, elpidite, lorenzenite, pyrochlore, monazite-(Ce), gagarinite-(Y), ralstonite, gearsutite, molybdenite.

**Distribution:** From near Lake Gjerdingen, Gjerdingselva, Lunner, Oppland, Norway.

**Name:** For Lake *Gjerdingen* nearby the first discovered occurrence and with the suffix *-Fe* to indicate the dominant cation in the D site.

**Type Material:** Geological Museum, University of Oslo, Norway (33712, 33713, and 33715).

**References:** (1) Raade, G., G. Ferraris, A. Gula, and G. Ivaldi (2002) Gjerdingenite-Fe from Norway, a new mineral species in the labuntsovite group: description, crystal structure and twinning. *Can. Mineral.*, 40, 1629-1639. (2) (2003) *Amer. Mineral.*, 88(11), 1837 (abs. ref. 1).