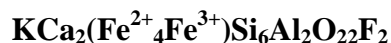


**Fluoro-potassichastingsite**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. Crystals, prismatic; in compact aggregates to 1 cm.

**Physical Properties:** *Cleavage:* Perfect on {110}, intersecting at 56°. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 6 D(meas.) = n.d. D(calc.) = 3.14

**Optical Properties:** Transparent. *Color:* Black, green on thin edges. *Streak:* Greenish gray. *Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.668(2)$   $\beta = 1.688(2)$   $\gamma = 1.698(2)$   $2V(\text{meas.}) = 40\text{--}70^\circ$   $2V(\text{calc.}) = 70^\circ$  *Pleochroism:* X = bluish green; Y = greenish to brownish green; Z = blue to light blue. *Dispersion:*  $r < v$ , weak. *Orientation:*  $Y = b$ ;  $Z \wedge c \approx 23^\circ$ .

**Cell Data:** *Space Group:* C2/m.  $a = 9.9480(3)$   $b = 18.1777(6)$   $c = 5.3302(2)$   
 $\beta = 105.140(1)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Greenwood (Patterson) iron mine, Orange County, New York, USA. 8.499(100), 3.151(76), 2.830 (53), 3.299(32), 2.722(23), 2.402(17), 3.401(11)

<b>Chemistry:</b>	(1)	(1)
SiO <sub>2</sub>	40.49	CaO 11.13
TiO <sub>2</sub>	0.11	Na <sub>2</sub> O 1.24
Al <sub>2</sub> O <sub>3</sub>	10.29	K <sub>2</sub> O 2.93
V <sub>2</sub> O <sub>3</sub>	0.03	Li <sub>2</sub> O 1.62
Cr <sub>2</sub> O <sub>3</sub>	0.01	F 2.23
Fe <sub>2</sub> O <sub>3</sub>	4.49	Cl 0.61
FeO	19.80	H <sub>2</sub> O 0.70
MnO	0.20	<u>-O=(F+Cl)</u> 1.08
MgO	6.68	Total 99.86

(1) Greenwood (Patterson) iron mine, Orange County, New York; average of 12 electron microprobe analyses, Fe<sub>2</sub>O<sub>3</sub> and FeO by Mössbauer spectroscopy, H<sub>2</sub>O by hydrogen extraction; using H<sub>2</sub>O from stoichiometry, corresponding to (K<sub>0.59</sub>Na<sub>0.25</sub>) $\Sigma=0.84$ (Ca<sub>1.87</sub>Na<sub>0.13</sub>) $\Sigma=2.00$ (Fe<sup>2+</sup><sub>2.60</sub>Mg<sub>1.56</sub>Fe<sup>3+</sup><sub>0.53</sub>Al<sub>0.26</sub>Mn<sub>0.03</sub>Ti<sub>0.01</sub>) $\Sigma=4.99$ (Si<sub>6.36</sub>Al<sub>1.64</sub>) $\Sigma=8.00$ O<sub>22.68</sub>O<sub>3</sub>[F<sub>1.11</sub>(OH)<sub>0.73</sub>Cl<sub>0.16</sub>] $\Sigma=2.00$ .

**Mineral Group:** Amphibole group.

**Occurrence:** A product of potassium-halogen metasomatism of a hastingsite and diopside-bearing rock.

**Association:** Magnetite, diopside, enstatite, pyrrhotite, chalcopyrite, pyrite, phlogopite.

**Distribution:** Greenwood (Patterson) iron mine, Harriman State Park, near Tuxedo, Orange County, New York, USA.

**Name:** For its composition and relationship to hastingsite.

**Type Material:** New York State Museum, Albany, New York, USA (catalog no. 21205).

**References:** (1) Lupulescu, M.V., J. Rakovan, D.M. Dyar, G.W. Robinson, and J.M. Hughes (2009) Fluoro-potassichastingsite from the Greenwood mine, Orange County, New York: a new end-member calcic amphibole. *Can. Mineral.*, 47, 909–916. (2) (2010) *Amer. Mineral.*, 95, 205 (abs. ref. 1).