Siderophyllite $\mathbf{KFe_2^{2+}Al(Al_2Si_2)O_{10}(F,OH)_2}$

Crystal Data: Monoclinic. *Point Group:* n.d. Crystals sharp, pseudohexagonal, to 1 cm; in foliated aggregates.

Physical Properties: *Cleavage:* {001}, perfect. Hardness = 2.5–3 D(meas.) = 3.1 D(calc.) = [3.17]

Optical Properties: Semitransparent. *Color:* Black, dark brown, dark green. *Optical Class:* Biaxial (–). *Pleochroism:* X = brown; $Y = Z$ = dark brown. *Orientation:* $Y = b$. *Dispersion:* $r < v$. $\alpha = 1.590$ $\beta = 1.640$ $\gamma = 1.640$ 2V(meas.) = Small.

Cell Data: *Space Group:* n.d. (synthetic $\sim KFe_2^{2+}Al(Al_2Si_2)O_{10}(OH)_2$). $a = 5.348(2)$ $b = 9.261(3)$ $c = 10.263(4)$ $\beta = 100.19(7)°$ Z = 2

X-ray Powder Pattern: Altenberg, Germany; resembles zinnwaldite. (ICDD 25-1355). 9.99 (10b), 2.62 (10), 3.36 (9), 3.27 (9), 1.542 (9), 2.432 (8), 1.666 (8b)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	34.21	37.01	Na_2O	1.43	0.58
TiO_2		0.02	K_2O	6.50	9.02
Al_2O_3	16.53	15.89	Rb_2O		0.19
Fe_2O_3	20.15	trace	Cs_2O		0.12
FeO	14.17	30.16	F	0.08	3.88
MnO	0.91	1.01	Cl		0.24
MgO	1.34	0.22	H_2O		1.92
CaO	0.48	0.10	LOI	4.54	
Li_2O		1.01	$-O = (F,Cl)_2$	0.03	1.68
			Total	100.31	99.69

(1) Pikes Peak, Colorado, USA; loss on ignition taken as H_2O. (2) Brooks Mountain [*sic*], Alaska, USA; corresponds to $(K_{0.93}Na_{0.09}Rb_{0.01})_{\Sigma=1.03}Fe^{2+}_{2.02}(Al_{0.47}Li_{0.33}Mn_{0.07}Mg_{0.03})_{\Sigma=0.90}(Si_{2.97}Al_{1.03})_{\Sigma=4.00}O_{10}(F,OH)_2$.

Polymorphism & Series: 1M polytype.

Mineral Group: Mica group.

Occurrence: In pegmatites in nepheline syenite; in greisens in granite and aplite.

Association: Microcline, astrophyllite (Pikes Peak, Colorado, USA).

Distribution: On Pikes Peak, El Paso Co., Colorado, and in the Brooks Range, Alaska, USA. At Mont Saint-Hilaire, Quebec, Canada. From Altenberg, Saxony, Germany. In the Reschen Pass, Trentino-Alto Adige, Italy. At Badzhala, Ural Mountains, Russia. From Newcastle, Co. Down, Ireland. Probably additional localities exist.

Name: From the Greek for *iron* and *leaf*, for its composition and habit.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 627–632. (2) Foster, M.D. (1960) Interpretation of the composition of trioctahedral micas. U.S. Geol. Sur. Prof. Paper 354-B, 11–49. (3) Levillain, C., P. Maurel, and F. Menil (1981) Mössbauer studies of synthetic and natural micas on the polylithionite-siderophyllite join. Phys. Chem. Minerals, 7, 71–76.