Lepidolite $K(Li,Al)_3(Si,Al)_4O_{10}(F,OH)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$ or m (1M). Tabular to prismatic pseudohexagonal crystals, commonly with rounded terminal faces, to 20 cm. In coarse to fine scaly aggregates and massive. *Twinning:* Rare, composition plane {001}, twin axis [310].

Physical Properties: *Cleavage:* {001}, perfect. *Tenacity:* Flexible, elastic. Hardness = 2.5–4 D(meas.) = 2.8–2.9 D(calc.) = 2.693

Optical Properties: Transparent to translucent. *Color:* Pink, purple, rose-red, violet-gray, yellowish, white, colorless; colorless to pale pink in thin section. *Luster:* Pearly to vitreous. *Optical Class:* Biaxial (–). *Pleochroism:* X = almost colorless; $Y = Z$ = pink, pale violet. *Orientation:* $Y = b$; $X \wedge a = 90°–87°$; $Z \wedge a = 0°–7°$. *Dispersion:* $r > v$, weak. *Absorption:* $Y \simeq Z > X$. $\alpha = 1.525–1.548$ $\beta = 1.551–1.585$ $\gamma = 1.554–1.587$ 2V(meas.) = 0°–58°

Cell Data: *Space Group:* $C2/m$ (1M). $a = 5.209(2)$ $b = 9.011(5)$ $c = 10.149(5)$ $\beta = 100.77(4)°$ Z = 2

X-ray Powder Pattern: Topsham, Sagadahoc Co., Maine, USA; 1M. (ICDD 10-485). 3.34 (100), 10.0 (75), 4.99 (75), 3.62 (75), 3.08 (75), 2.578 (75), 1.992 (60)

X-ray Powder Pattern: Gunnison Co., Colorado, USA; $2M_2$. (ICDD 14-11). 2.577 (100), 1.989 (80), 10.0 (60), 5.0 (50), 4.5 (50), 3.62 (50), 3.48 (50)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	48.58	51.45	K_2O	10.02	9.09
Al_2O_3	28.93	22.62	Rb_2O	0.91	1.69
Fe_2O_3		0.16	Cs_2O	0.16	0.94
FeO	0.04	0.04	F	4.93	7.40
MnO	0.92	0.51	H_2O^+	2.56	2.36
MgO	0.00	0.53	H_2O^-	0.54	0.84
CaO	trace	0.20	$-O = F_2$	2.08	3.11
Li_2O	3.70	5.42	rem.		0.01
Na_2O	0.87	0.26	Total	100.08	100.41

(1) Stewart mine, Pala, California, USA; TiO_2 trace; corresponds to $(K_{0.85}Na_{0.11}Rb_{0.04})_{\Sigma=1.00}(Al_{1.50}Li_{0.99}Mn_{0.05})_{\Sigma=2.54}(Si_{3.23}Al_{0.77})_{\Sigma=4.00}O_{10}[(OH)_{1.14}F_{1.04}]_{\Sigma=2.18}$. (2) Radkovice, Czech Republic; remainder includes traces of Ga_2O_3, Cr_2O_3, and Tl_2O_3; corresponds to $(K_{0.79}Rb_{0.07}Na_{0.03}Cs_{0.03}Ca_{0.01})_{\Sigma=0.93}(Li_{1.48}Al_{1.30}Mg_{0.05}Mn_{0.03}Fe^{3+}_{0.01})_{\Sigma=2.87}(Si_{3.49}Al_{0.51})_{\Sigma=4.00}O_{10}(F,OH)_2$.

Polymorphism & Series: 1M, $2M_2$, 3A polytypes common; $2M_1$, $3M_2$ rare; a group name.

Mineral Group: Mica group.

Occurrence: In granite pegmatites, derived by metasomatic replacement of muscovite or biotite; in some high-temperature quartz veins, greisens, and granites.

Association: Spodumene, elbaite, amblygonite, columbite, cassiterite, topaz, beryl, micas.

Distribution: At Rožná, near Bystřice, Czech Republic. From Alabashka, Ural Mountains, Russia. In the Varuträsk pegmatite, 15 km northwest of Skellefteå, Västerbotten, Sweden. In the USA, at Mt. Mica, near Paris, Oxford Co., and Auburn, Androscoggin Co., Maine; in the Mesa Grande and Pala districts, San Diego Co., California; from the Brown Derby pegmatite, Gunnison Co., Colorado; in the Ingersoll mine, near Keystone, Pennington Co., South Dakota. From the Tanco mine, Bernic Lake, Manitoba, Canada. At Maharitra, Mt. Bity, Madagascar. From Bikita,

Zimbabwe. In India, at Hazaribagh, Bihar. From the Virgem da Lapa pegmatite, Minas Gerais, Brazil.

Name: From the Greek *lepidos* for *scale*, in allusion to its micaceous structure.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 624–625. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 3, sheet silicates, 85–91. (3) Guggenheim, S. (1981) Cation ordering in lepidolite. Amer. Mineral., 66, 1221–1232.