Kaliophilite $KAlSiO_4$

Crystal Data: Hexagonal. *Point Group*: 3. In bundles of slender acicular to threadlike crystals. *Twinning*: Micro-twinning observed in structure analysis.

Physical Properties: *Cleavage*: {0001}, perfect. *Tenacity*: Brittle. Hardness = 6
D(meas.) = 2.493-2.649 D(calc.) = [2.65]

Optical Properties: Transparent. *Color*: Colorless. *Luster*: Silky, brilliant.
Optical Class: Uniaxial (-). ω = 1.536 ε = 1.531

Cell Data: *Space Group*: *P*3. a = 27.0597(16) c = 8.5587(6) Z = 54

X-ray Powder Pattern: Vesuvius, Italy.
3.09 (100), 2.593 (30), 2.131 (25), 4.26 (15), 3.76 (12), 3.02 (12), 2.814 (12D)

Chemistry:

	(1)	(2)	(3)
SiO_2	39.2	38.87	37.99
TiO_2		0.00	
Al_2O_3	33.36	31.89	32.23
FeO		0.07	
MnO		0.00	
CaO	0.47	0.05	
Na_2O	2.88	0.77	
K_2O	24.13	28.76	29.78
Total	100.04	100.41	100.00

(1) Monte Somma, Italy. (2) Do.; by electron microprobe. (3) $KAlSiO_4$.

Polymorphism & Series: Polymorphous with kalsilite, panunzite, and trikalsilite.

Occurrence: In blocks of biotite-pyroxenite volcanic ejecta.

Association: Biotite, pyroxene, augite, melilite, calcite (Monte Somma, Italy); clinopyroxene, garnet, leucite, haüyne, latiumite (Albano, Italy).

Distribution: In Italy, from Monte Somma and Vesuvius, Campania (TL); at Albano and Marino, Colle Cimino, near Rome, Lazio.

Name: From the Greek for potassium, *kalium*, and for “friend”, recognizing potassium's presence.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 427. (2) Bannister, M.A. (1931) A chemical, optical, and X-ray study of nepheline and kaliophilite. Mineral. Mag., 22, 569-608. (3) Smith, J.V. and O.F. Tuttle (1957) The nepheline-kalsilite system: I. X-ray data for the crystalline phases. Amer. J. Sci., 255, 282-305. (4) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 231-270. (5) Mugnaioli, E., E. Bonaccorsi, A.E. Lanza, E. Elkaim, V. Diez-Gómez, I. Sobrados, M. Gemmia, and M. Gregorkiewitze (2020) The structure of kaliophilite $KAlSiO_4$, a long-lasting crystallographic problem. IUCrJ, 7, 1070-1083.