Lileyite $Ba_2(Na,Fe,Ca)_3MgTi_2(Si_2O_7)_2O_2F_2$

Crystal Data: Monoclinic. *Point Group:* 2/*m*. Crystals elongated platy, to 0.3 mm. Dominant form {100}.

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = 3-4 D(meas.) = n.d. D(calc.) = 3.776

Optical Properties: Transparent. *Color:* Brown. *Streak:* White. *Luster:* n.d. *Optical Class:* Biaxial (+). α = 1.718(5) β = 1.735(5) γ = 1.755(5) 2V (meas.) = 75(15)° 2V (calc.) = 86° *Dispersion*: *r* > *v*, medium. *Orientation*: *X* = *a*; *Y* = elongation. *Pleochroism*: Medium, *Z* = greyish-brown; *Y* = light brown; *X* = colorless. *Absorption*: *Z* > *Y* > *X*.

Cell Data: *Space Group: C2/m*. *a* = 19.905(1) *b* = 7.098(1) *c* = 5.405(1) β = 96.349(5)° *Z* = 2

X-ray Powder Pattern: Löhley quarry, Germany.
2.792 (100), 3.464 (76), 2.672 (54), 2.140 (52), 3.749 (45), 2.624 (43), 3.045 (37)

Chemistry:

	(1)
SiO_2	28.05
BaO	26.39
TiO_2	18.53
Na_2O	6.75
MgO	4.58
FeO	4.48
CaO	2.3
SrO	2.23
MnO	1.44
K_2O	1.41
Nb_2O_5	0.95
F	3.88
$-O=F_2$	1.63
Total	99.36

(1) Löhley quarry, Germany; average of 5 SEM-EDX analyses; corresponding to $Ba_{1.50}Sr_{0.19}K_{0.26}Na_{1.89}Ca_{0.36}Mn_{0.18}Mg_{0.99}Fe_{0.54}Ti_{2.01}Nb_{0.06}Si_{4.06}O_{16.23}F_{1.77}$.

Mineral Group: Lamprophyllite group.

Occurrence: Occurs in miarolitic cavities in an alkaline basalt.

Association: Nepheline, leucite, augite, magnetite, fluorapatite, perovskite, götzenite.

Distribution: Löhley quarry, Üdersdorf, near Daun, Eifel Mountains, Rhineland-Palatinate (Rheinland-Pfalz), Germany.

Name: For the old name of the first known locality, Liley, Germany.

Type Material: A.E. Fersman Mineralogical Museum , Russian Academy of Sciences, Moscow, Russia, 4106/1.

References: (1) Chukanov, N.V., I.V. Pekov, R.K. Rastsvetaeva, S.M. Aksenov, A.E. Zadov, K.V. Van, G. Blass, W. Shüller, and B. Ternes (2012) Lileyite, $Ba_2(Na,Fe,Ca)_3MgTi_2(Si_2O_7)_2O_2F_2$, a new lamprophyllite-group mineral from the Eifel volcanic area, Germany. European Journal of Mineralogy, 24, 181-188. (2) (2013) Amer. Mineral., 98, 1080-1081 (abs. ref. 1).