**Leakeite** $NaNa_2[Mg_2Fe^{3+}_2Li]Si_8O_{22}(OH)_2$



**Crystal Data:** Monoclinic. *Point Group:* $2/m$. Anhedral crystals, prismatic along [001], to 1 mm, bounded by cleavage planes and terminated by irregular fracture surfaces.

**Physical Properties:** *Cleavage:* Perfect on {110} [intersecting at ∼56° and ∼124°.] *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = 6 D(meas.) = 3.11 D(calc.) = 3.107

**Optical Properties:** Translucent. *Color:* Deep red. *Streak:* Very pale pink. *Luster:* Vitreous.
*Optical Class:* Biaxial (–). *Pleochroism:* Strong; $X \simeq Y$ = dark mauve-red; $Z$ = light pinkish red. *Orientation:* $Z = b$; $X \wedge c = 10°$; $Y \wedge a = 4°$. *Dispersion:* $r \ll v$, strong. *Absorption:* $X \simeq Y > Z$. $\alpha = 1.667(1)$ $\beta = 1.675(1)$ $\gamma = 1.691(1)$ 2V(meas.) = 59°–71° 2V(calc.) = 72(10)°

**Cell Data:** *Space Group:* $C2/m$. $a = 9.822(3)$ $b = 17.836(6)$ $c = 5.286(2)$ $\beta = 104.37(3)°$ Z = 2

**X-ray Powder Pattern:** Kajlidongri mine, India.
3.122 (100), 8.399 (56), 2.798 (48), 3.254 (20), 3.383 (18), 2.696 (15), 4.461 (13)

**Chemistry:**

| | (1) |
|---|---|
| $SiO_2$ | 55.80 |
| $TiO_2$ | 0.03 |
| $Al_2O_3$ | 1.27 |
| $Fe_2O_3$ | 12.23 |
| $Mn_2O_3$ | 3.86 |
| MgO | 10.96 |
| CaO | 0.50 |
| $Li_2O$ | [1.42] |
| $Na_2O$ | 9.69 |
| $K_2O$ | 1.12 |
| F | 1.08 |
| $H_2O$ | [1.63] |
| $-O = F_2$ | 0.45 |
| Total | [99.14] |

(1) Kajlidongri mine, India; by electron microprobe, average of six analyses, Li and $H_2O$ calculated from stoichiometry, original total given as 99.11%; corresponds to $(Na_{2.67}K_{0.20}Ca_{0.08})_{\Sigma=2.95}(Mg_{2.32}Fe^{3+}_{1.31}Li_{0.81}Mn^{3+}_{0.42}Al_{0.14})_{\Sigma=5.00}(Si_{7.98}Al_{0.07})_{\Sigma=8.00}O_{22}[(OH)_{1.49}F_{0.51}]_{\Sigma=2.00}$.

**Mineral Group:** Amphibole (alkali) group: $Na_B \geq 1.34$; $Li_C \geq 0.5$; $Fe^{3+} > Mn^{3+}$.

**Occurrence:** In a metasediment rich in manganese minerals, crosscut by epigenetic veins.

**Association:** Albite, braunite, bixbyite.

**Distribution:** In the Kajlidongri manganese mine, Jhabua district, Madhya Pradesh, India.

**Name:** To honor Bernard E. Leake, Professor of Geology, Glasgow University, Glasgow, Scotland, for his work on amphiboles.

**Type Material:** Canadian Museum of Nature, Ottawa, Canada.

**References:** (1) Hawthorne, F.C., R. Oberti, L. Ungaretti, and J. Grice (1992) Leakeite, $NaNa_2(Mg_2Fe^{3+}_2Li)Si_8O_{22}(OH)_2$, a new alkali amphibole from the Kajlidongri manganese mine, Jhabua district, Madhya Pradesh, India. Amer. Mineral., 77, 1112–1115.