Liddicoatite $Ca(Li,Al)_3Al_6(BO_3)_3Si_6O_{18}(O,OH,F)_4$

Crystal Data: Hexagonal. *Point Group:* 3*m*. Crystals stout prismatic, with curved convex trigonal outline, deeply striated ‖ [0001], to 25 cm.

Physical Properties: *Cleavage:* Poor on {0001}. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = 7.5 D(meas.) = 3.02 D(calc.) = 3.05

Optical Properties: Transparent to translucent. *Color:* Brown, green, pink, red, blue; commonly zoned parallel to pyramid faces. *Streak:* Very light brown. *Luster:* Vitreous on fractures.
Optical Class: Uniaxial (–). *Pleochroism:* Strong; *O* = dark brown; *E* = light brown.
$\omega = 1.637$ $\epsilon = 1.621$

Cell Data: *Space Group: R3m.* $a = 15.875(3)$ $c = 7.126(2)$ $Z = 3$

X-ray Powder Pattern: Antsirabe, Madagascar. (ICDD 30-478).
2.933 (100), 2.559 (85), 3.962 (55), 4.197 (50), 3.445 (50), 2.025 (40), 1.9054 (35)

Chemistry:

	(1)
SiO_2	37.7
TiO_2	0.38
B_2O_3	10.89
Al_2O_3	37.9
FeO	0.83
MnO	0.27
MgO	0.11
CaO	4.21
Li_2O	2.48
Na_2O	0.88
F	1.72
H_2O^+	2.69
$-O = F_2$	0.72
Total	99.34

(1) Antsirabe, Madagascar; corresponds to $(Ca_{0.72}Na_{0.27})_{\Sigma=0.99}(Li_{1.59}Al_{1.13}Fe^{2+}_{0.11}Ti_{0.05}Mn_{0.04}Mg_{0.03})_{\Sigma=2.95}Al_6(BO_3)_3Si_{6.02}O_{18}[(OH)_{2.86}F_{0.87}O_{0.27}]_{\Sigma=4.00}$.

Mineral Group: Tourmaline group.

Occurrence: Detrital in soil, an apparent product of the local pegmatites.

Association: Quartz, elbaite, albite, micas.

Distribution: From Antsirabe, Tsilaizina, and Anjanabonoina, Madagascar. There are probably other localities but chemical analysis is required for distinction from other tourmaline group minerals.

Name: For Richard Thomas Liddicoat, Jr. (1918–), American gemologist.

Type Material: National Museum of Natural History, Washington, D.C., USA, 135815; The Natural History Museum, London, England, 1977,59.

References: (1) Dunn, P.J., D.E. Appleman, and J.E. Nelen (1977) Liddicoatite, a new calcium end-member of the tourmaline group. Amer. Mineral., 62, 1121–1124. (2) Nuber, B. and K. Schmetzer (1981) Strukturverfeinerung von Liddicoatit. Neues Jahrb. Mineral., Monatsh., 215–219 (in German with English abs.). (3) Deer, W.A., R.A. Howie, and J. Zussman (1986) Rock-forming minerals, (2nd edition), v. 1B, disilicates and ring silicates, 559–602.