TOURETITE, A NEW BORATE MINERAL FROM MADAGASCAR

Frédéric HATERT[1], Martin DEPRET[1], and Florent BOMAL[1]

[1]*Laboratory of Mineralogy B18, University of Liège, B-4000 Liège, Belgium*

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Touretite, $LiAl_4Be_4(B_{11}Be)O_{28}$, is a borate mineral found in the Ambalabe granitic pegmatite, Madagascar. The mineral, which is the Li-rich analogue of londonite and rhodizite, occurs as white to pinkish rhombic-dodecahedral crystals reaching 1 cm in diameter, and deposited on tourmalines, feldspars, and heavily corroded spodumene and danburite. The streak is white, the lustre vitreous, and touretite does not show any fluorescence under short wave (254 nm) or long wave (366 nm) ultraviolet light. The Mohs hardness is 8, cleavage is absent, the tenacity is brittle, the fracture is conchoidal, and the measured density is 3.06(1) g/cm^3. Optically, touretite is colorless, isotropic, non-pleochroic, and shows an index of refraction of n = 1.6952 $\pm$ 0.0005 (measured using a light source of 589 nm wavelength).

The empirical formula, calculated on the basis of 28 oxygen atoms per formula unit from the chemical analysis determined by LA-TOF-ICP-MS, is $(Li_{0.38}Cs_{0.24}K_{0.14}Rb_{0.03}Na_{0.02}Pb_{0.01}[]_{0.18})_{\Sigma 1.00}(Al_{4.00}Si_{0.05}Fe^{2+}_{0.03}Mn_{0.02})_{\Sigma 4.10}(Be_{3.60}Li_{0.40})_{\Sigma 4.00}(B_{11.28}Be_{0.72})_{\Sigma 12.00}O_{28}$. The cubic unit-cell parameters, determined by single-crystal X-ray diffraction methods, are *a* = 7.31202(15) Å, V = 390.942(14) Å^3. The structure refinement was performed in space group *P*-43*m* from 226 unique reflections, to the final R1 value of 0.0444.

The structure of touretite contains clusters of four edge-sharing AlO_6 octahedra located around the origin of the unit-cell, and linked to the BeO_4 and BO_4 tetrahedra by corner-sharing. The alkali cations occupy the Li/Cs site in a large cavity at the center of the unit-cell and have a coordination number of 12. The coordination polyhedron can be described as a truncated tetrahedron, that shares its small triangular faces with faces of the BeO_4 tetrahedra. The species was accepted by the Commission on New Minerals, Nomenclature and Classification of the International Mineralogical Association (IMA-CNMNC) under number IMA 2023-003a, and the name was chosen to honor Jacques and Lydie Touret, for their contribution to mineralogical sciences.