Hectorite $Na_{0.3}(Mg, Li)_3Si_4O_{10}(OH)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As thin laths, to 2 μm, and as aggregates of such laths.

Physical Properties: *Cleavage:* {001}, perfect. *Fracture:* Uneven. Hardness = 1–2 D(meas.) = ~2.3 D(calc.) = n.d. Swells on addition of H_2O. Positive identification of minerals in the smectite group may need data from DTA curves, dehydration curves, and X-ray powder patterns before and after treatment by heating and with organic liquids.

Optical Properties: Translucent, transparent in thin section. *Color:* White, cream, pale brown, mottled. *Luster:* Earthy to waxy, dull.
Optical Class: Biaxial (–). α = ~1.49 β = 1.50 γ = 1.52 2V(meas.) = Small.

Cell Data: *Space Group:* $C2/m$. a = 5.2 b = 9.16 c = 16.0 β = ~ 99° Z = n.d.

X-ray Powder Pattern: Hector, California, USA; spacings variable by humidity, intensities variable by orientation.
4.58 (100), 1.53 (100), 15.8 (80), 2.66 (80), 1.32 (80), 1.30 (80), 2.48 (60)

Chemistry:

	(1)	(2)
SiO_2	53.68	53.95
TiO_2		trace
Al_2O_3	0.60	0.14
Fe_2O_3		0.03
MgO	25.34	25.89
CaO	0.52	0.16
Li_2O	1.12	1.22
Na_2O	3.00	3.04
K_2O	0.07	0.23
Cl	0.31	
H_2O^+	8.24	5.61
H_2O^-	7.28	9.29
Total	100.16	99.56

(1) Hector, California, USA; corresponds to $(Na_{0.42}Ca_{0.04}K_{0.01})_{\Sigma=0.47}(Mg_{2.73}Li_{0.33})_{\Sigma=3.06}(Si_{3.89}Al_{0.05})_{\Sigma=3.94}O_{10}(OH)_2$. (2) Do.; corresponds to $(Na_{0.42}K_{0.02}Ca_{0.01})_{\Sigma=0.45}(Mg_{2.78}Li_{0.36})_{\Sigma=3.14}(Si_{3.89}Al_{0.01})_{\Sigma=3.90}O_{10}(OH)_2 \cdot 0.35H_2O$.

Mineral Group: Smectite group.

Occurrence: In a bentonite deposit, altered from clinoptilolite derived from volcanic tuff and ash with a high glass content, related to hot spring activity (Hector, California, USA).

Association: Calcite, clinoptilolite (Hector, California, USA).

Distribution: In the USA, five km south of Hector, San Bernardino Co., California; in the Lyles deposit, 38 km northeast of Hillside, Yavapai Co., Arizona; and at Disaster Peak, in the Montana Mountains, near McDermitt, Disaster district, Humboldt Co., Nevada. From around Puy Chalard, Puy-de-Dôme, France. In the Balıkesir colemanite deposit, Balıkesir Province, Turkey.

Name: For the locality at Hector, California, USA.

Type Material: n.d.

References: (1) Foshag, W.F. and A.O. Woodford (1936) Bentonitic magnesian clay-mineral from California. Amer. Mineral., 21, 238–244. (2) Strese, H. and U. Hofmann (1941) Synthesis of magnesium silicate gels with two-dimensional regular structure. Zeit. anorginsche allgemeine Chemie, 247, 65–95. (3) (1944) Amer. Mineral., 29, 73 (abs. ref. 2). (4) Nagelschmidt, G. (1938) On the atomic arrangement and variability of the members of the montmorillonite group. Mineral. Mag., 25, 140–155. (5) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 3, sheet silicates, 226–245.