Lemanskiite $NaCaCu_5(AsO_4)_4Cl•5H_2O$

Crystal Data: Tetragonal. *Point Group*: 422. As thin tabular crystals to 4 mm and invariably bent; as massive nodules to 5 cm, as rosette-shaped aggregates of subparallel, strongly bent lamellar crystals to 0.3 mm, or as aggregates of acicular crystal clusters to 0.8 mm.

Physical Properties: *Cleavage*: Excellent on {001}. *Fracture*: Uneven. *Tenacity*: Brittle. *Hardness* = ~ 2.5 D(meas.) = 3.78(1) D(calc.) = 3.863(5)

Optical Properties: Translucent. *Color*: Dark sky-blue. *Streak*: Light blue. *Luster*: Vitreous. *Optical Class*: Uniaxial (-). ω = 1.749(2) ε = 1.647(2) *Pleochroism*: Strong, *O* = dark green-blue, *E* = light blue-green (light turquoise). *Orientation*: *E* = *c*, *O* ⊥ *c*.

Cell Data: *Space Group*: $P4_122$ (or $P4_322$). a = 9.9758(4) c = 36.714(1) Z = 8

X-ray Powder Pattern: Abundancia gold mine, Antofagasta Province, Chile.
9.177 (100), 4.588 (32), 3.059 (15), 4.167 (10), 9.600 (9), 2.606 (6), 2.924 (5)

Chemistry:

	(1)	(2)
Na_2O	3.04	2.92
CaO	5.33	5.28
CuO	37.76	37.45
As_2O_5	43.53	43.28
Cl	3.23	3.34
H_2O	8.50	8.48
-O = Cl	0.73	0.75
Total	100.66	100.00

(1) Abundancia gold mine, Antofagasta Province, Chile; average of 15 electron microprobe analyses supplemented by IR spectroscopy, TGA and CHN analyses, corresponds to $Na_{1.04}Ca_{1.00}Cu_{5.01}(AsO_4)_{4.00}[Cl_{0.96}(OH)_{0.11}]_{\Sigma=1.07}•4.93\ H_2O$. (2) $NaCaCu_5(AsO_4)_4Cl•5H_2O$.

Occurrence: A secondary mineral, as nodules or veinlets in gold-bearing quartz veins of a hydrothermal deposit.

Association: Lammerite, olivenite, mansfieldite, senarmontite, a mineral of the crandallite group, rutile, anatase, talc. Lavendulan transforms easily to lemanskiite.

Distribution: From the Abundancia gold mine, El Guanaco mining district, south of Cerro La Estrella, ~ 95 km east of Taltal, Region II, Antofagasta Province, Chile.

Name: Honors Chester S. Lemanski, Jr. (b. 1947), New Jersey, USA, a mineral collector who first recognized this new mineral.

Type Material: National Museum, Prague, Czech Republic (P1p14/99).

References: (1) Ondruš, P., F. Veselovský, R. Skála, J. Sejkora, R. Pažout, J. Frýda, A. Gabašová, and J. Vajdak (2006) Lemanskiite, $NaCaCu_5(AsO_4)_4Cl•5H_2O$, a new mineral species from the Abundancia Mine, Chile. Can. Mineral., 44, 523-531. (2) (2006) Amer. Mineral., 91, 1947-1948 (abs. ref. 1).