Chinleite-(Y) $NaY(SO_4)_2 \cdot H_2O$

Crystal Data: Orthorhombic. *Point Group*: 222. As sprays or bow-ties of thin hexagonal {100} prisms with pyramidal terminations by {101} and {011}, to ~0.3 mm.

Physical Properties: *Cleavage*: Good ‖ [001], probably on {100}. *Fracture*: Splintery. *Tenacity*: Brittle. Hardness = 2.5-3 D(meas.) = n.d. D(calc.) = 3.385 Slowly soluble in water.

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Uniaxial (+). ω = 1.565(1) ε = 1.603(1)

Cell Data: *Space Group*: $P3_121$. a = 6.890(2) c = 12.767(2) Z = 3

X-ray Powder Pattern: Blue Lizard mine, Red Canyon, San Juan County, Utah, USA.
3.010 (100), 2.826 (95), 1.849 (67), 5.43 (63), 6.01 (59), 3.457 (46), 2.137 (39)

Chemistry:	(1)	(2)
Na_2O	4.36	9.62
CaO	4.44	
Y_2O_3	28.17	35.06
Ce_2O_3	0.44	
Pr_2O_3	0.12	
Nd_2O_3	0.64	
Sm_2O_3	0.40	
Eu_2O_3	0.24	
Gd_2O_3	1.84	
Dy_2O_3	5.67	
Ho_2O_3	1.10	
Er_2O_3	2.79	
Yb_2O_3	0.73	
SO_3	44.41	49.72
H_2O	[3.50]	5.59
Total	98.95	100.00

(1) Blue Lizard mine, Red Canyon, San Juan County, Utah, USA; average of 7 electron microprobe analyses, H_2O calculated from structure; corresponds to $(Na_{0.507}Ca_{0.285}Y_{0.176})_{\Sigma=0.968}(Y_{0.724}Dy_{0.110}Er_{0.053}Gd_{0.037}Ho_{0.021}Yb_{0.013}Nd_{0.014}Eu_{0.005}Sm_{0.008}Ce_{0.010}Pr_{0.003}La_{0.002})_{\Sigma=1.000}(SO_4)_2 \cdot H_{1.401}O$.
(2) $NaY(SO_4)_2 \cdot 7H_2O$.

Occurrence: A secondary phase formed at ambient temperature by evaporative processes at moderately high relative humidity at the surface of a rock with high relative porosity and in an environment that was relatively oxidizing and generally acidic.

Association: Gypsum, hexahydrite, johannite, metauranospinite, natrojarosite.

Distribution: From the Blue Lizard mine, Red Canyon, White Canyon district, San Juan County, Utah, USA.

Name: For the *Chinle* Formation of Upper Triassic age and a suffix for the dominant rare earth element, *y*ttrium.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (65632, 65633, and 65634).

References: (1) Kampf, A.R., B.P. Nash, and J. Marty (2017) Chinleite-(Y), $NaY(SO_4)_2 \cdot H_2O$, a new rare-earth sulfate mineral structurally related to bassanite. Mineral. Mag., 81(4), 909-916. (2) (2017) Amer. Mineral., 102, 2341-2342 (abs. ref. 1).