

Paratooite-(La)**(REE,Ca,Na,Sr)₆Cu(CO₃)₈**

Crystal Data: Orthorhombic. *Point Group:* 222, *mm2*, or *2/m 2/m 2/m*. As sheaves and radiating sprays of blade-like to tabular crystals to 200 μm .

Physical Properties: *Cleavage:* None observed, TEM suggests cleavage on {100}. *Fracture:* n.d. *Tenacity:* n.d. *Hardness* = 4 (By analogy to other REE carbonates). *D(meas.)* = 3.68(3) *D(calc.)* = 3.78 Effervescence in dilute HCl.

Optical Properties: Transparent. *Color:* Pale turquoise-blue to light blue, very pale blue in transmitted light. *Streak:* Pale blue. *Luster:* Vitreous to pearly.

Optical Class: Biaxial (-). $\alpha = 1.605(3)$ $\beta = 1.696(3)$ $\gamma = 1.752(2)$ $2V(\text{calc.}) = 72.6^\circ$

Pleochroism: Moderate, $X = \text{very pale blue}$, $Y = Z = \text{greenish blue}$. *Absorption:* $Z \approx Y \gg X$.

Cell Data: *Space Group:* *P222*, *Pmmm*, *P222₁* or *Pmm2*. $a = 10.0862(5)$ $b = 12.8088(6)$ $c = 7.2360(4)$ $Z = 2$

X-ray Powder Pattern: Paratoo Copper Mine, Australia.

2.927 (100), 5.047 (53), 2.530 (52), 4.786 (49), 3.957 (43), 3.468 (43), 2.344 (22)

Chemistry:	(1)
Y ₂ O ₃	0.72
La ₂ O ₃	26.47
Pr ₂ O ₃	7.74
Nd ₂ O ₃	8.15
Sm ₂ O ₃	0.66
Gd ₂ O ₃	0.85
CaO	7.57
SrO	3.15
CuO	5.77
Na ₂ O	3.30
F	0.24
CO ₂	32.05
NO ₂	1.12
H ₂ O ⁺	2.34
-O = F	0.10
Total	100.03

(1) Paratoo Copper Mine, Australia; electron microprobe analysis supplemented by IR spectroscopy and CHN analysis, corresponds to (La_{3.54}Ca_{2.94}Na_{2.32}Nd_{1.05}Pr_{1.03}Sr_{0.66}Y_{0.14}Gd_{0.10}Sm_{0.08})_{Σ=11.86}Cu_{1.58}(C_{15.84}N_{0.53})O_{47.76}F_{0.24}.

Occurrence: A secondary weathering mineral in a mineralized dolomitic slatestone cut by chalcopyrite and magnetite-bearing quartz veins.

Association: Kamphaugite-(Y), donnayite-(Y), bastnassite-(La), malachite, nontronite, “limonite”.

Distribution: From the Paratoo Copper Mine, 30 km southwest of Yunta, on the western edge of the Olary Province, South Australia.

Name: For the locality that produced the first specimens – *Paratoo* Copper Mine, Australia and the dominant rare earth element, *Lanthanum*.

Type Material: The South Australian Museum, Adelaide, Australia (G29614).

References: (1) Pring, A., K. Wallwork, J. Brugger, and U. Kolitsch (2006) Paratooite-(La), a new lanthanum-dominant rare-earth copper carbonate from Paratoo, South Australia. *Mineral. Mag.*, 70(1), 131-138. (2) (2006) *Amer. Mineral.*, 91, 1455-1456 (abs. ref. 1).