

Astrocyanite-(Ce)**Cu₂(Ce, Nd, La)₂(UO₂)(CO₃)₅(OH)₂•1.5H₂O**

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Crystal Data: Hexagonal. *Point Group:* 6/m 2/m 2/m, $\bar{6}m2$, 6mm, or 622. Tabular {0001} crystals, to 1 mm, isolated or forming flat rosettes.

Physical Properties: *Cleavage:* On {0001}. *Hardness* = 2–3 *D(meas.)* = 3.80 *D(calc.)* = 3.95 *Radioactive.*

Optical Properties: *Translucent to opaque. Color:* Pale blue, bright blue, blue-green. *Luster:* Vitreous.

Optical Class: Uniaxial (-). *Pleochroism:* Strong; *O* = blue; *E* = nearly colorless. *Orientation:* *E* ⊥ {0001}. $\omega = 1.688(2)$ $\epsilon = 1.638(2)$

Cell Data: *Space Group:* *P6/mmm*, $P\bar{6}m2$, $P\bar{6}2m$, *P6mm*, or *P622*. *a* = 14.96(2) *c* = 28.86(4) *Z* = 12

X-ray Powder Pattern: Kamoto-East mine, Congo. 6.73 (100), 3.72 (90), 4.16 (60), 4.30 (50), 13.3 (40), 2.488 (40), 2.154 (40)

Chemistry:

	(1)
UO ₃	28.16
Ce ₂ O ₃	11.83
Nd ₂ O ₃	9.74
La ₂ O ₃	3.38
Pr ₂ O ₃	2.48
Sm ₂ O ₃	2.00
Y ₂ O ₃	0.15
CuO	15.55
CaO	0.61
CO ₂	21.40
H ₂ O	[4.70]
Total	[100.00]

(1) Kamoto-East mine, Congo; by electron microprobe, average of six analyses, CO₂ by CHN, H₂O by difference; corresponds to Cu_{2.02}Ca_{0.11}(Ce_{0.74}Nd_{0.60}La_{0.22}Pr_{0.16}Sm_{0.12}Y_{0.01})_{Σ=1.85}(UO₂)_{1.02}(CO₃)_{5.02}•2.70H₂O.

Occurrence: In the oxidation zone of the uranium-bearing portion of a Cu–Co deposit.

Association: Uraninite, uranophane, kamotoite-(Y), françoisite-(Nd), shabaite-(Nd), schuilingite-(Nd), masuyite.

Distribution: From the Kamoto-East Cu–Co mine, five km west of Kolwezi, Katanga Province, Congo (Shaba Province, Zaire).

Name: From the Greek *astro* and *kyanos*, alluding to the starlike habit and blue color, and for *cerium* as the dominant rare-earth element.

Type Material: Royal Belgian Institute of Natural Sciences, Brussels, Belgium, RC3513.

References: (1) Deliens, M. and P. Piret (1990) L'astrocyanite-(Ce), Cu₂(TR)₂(UO₂)(CO₃)₅(OH)₂•1, 5H₂O, nouvelle espèce minérale de Kamoto, Shaba, Zaïre. *Eur. J. Mineral.*, 2, 407–411 (in French with English abs.). (2) (1991) *Amer. Mineral.*, 76, 665 (abs. ref. 1).