Astrocyanite-(Ce) \( \text{Cu}_2(\text{Ce, Nd, La})_2(\text{UO}_2)(\text{CO}_3)_5(\text{OH})_2 \cdot 1.5\text{H}_2\text{O} \)

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


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: \( E \perp \{0001\} \). \( \omega = 1.688(2) \) \( \epsilon = 1.638(2) \)

Cell Data: Space Group: \( P\overline{6}/m \ \overline{6} \overline{6} \ 2 \overline{m}, \ P6\overline{2}m, \ P6mm, \) 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), 2.48 (40), 2.15 (40)

Chemistry:

<table>
<thead>
<tr>
<th>( \text{UO}_3 )</th>
<th>( \text{Ce}_2\text{O}_3 )</th>
<th>( \text{Nd}_2\text{O}_3 )</th>
<th>( \text{La}_2\text{O}_3 )</th>
<th>( \text{Pr}_2\text{O}_3 )</th>
<th>( \text{Sm}_2\text{O}_3 )</th>
<th>( \text{Y}_2\text{O}_3 )</th>
<th>( \text{CuO} )</th>
<th>( \text{CaO} )</th>
<th>( \text{CO}_2 )</th>
<th>( \text{H}_2\text{O} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.16</td>
<td>11.83</td>
<td>9.74</td>
<td>3.38</td>
<td>2.48</td>
<td>2.00</td>
<td>0.15</td>
<td>15.55</td>
<td>0.61</td>
<td>21.40</td>
<td>[4.70]</td>
</tr>
</tbody>
</table>

Total [100.00]

(1) Kamoto-East mine, Congo; by electron microprobe, average of six analyses, \( \text{CO}_2 \) by CHN, \( \text{H}_2\text{O} \) by difference: corresponds to \( \text{Cu}_{2.02}\text{Ca}_{0.11}(\text{Ce}_{0.74}\text{Nd}_{0.69}\text{La}_{0.22}\text{Pr}_{0.16}\text{Sm}_{0.12}\text{Y}_{0.01})\Sigma=1.85(\text{UO}_2)_{1.02}(\text{CO}_3)_{5.02} \cdot 2.70\text{H}_2\text{O} \)

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

Association: Uraninite, uranophane, kamotoite-(Y), francoisite-(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.