Cumengéite

Pb$_{21}$Cu$_{20}$Cl$_{42}$(OH)$_{40}$·6H$_2$O

Crystal Data: Tetragonal. Point Group: $4/m 2/m 2/m$. Rarely as isolated single crystals of pseudo-octahedral or pseudocubo-octahedral habit; more commonly as oriented overgrowths on cube faces of crystals of boleite and pseudoboleite, in groupings which mimic twins, to 8 cm.

Physical Properties: Cleavage: {101}, good; {110}, distinct; {001}, poor. Hardness = 2.5
D(meas.) = 4.656 D(calc.) = 4.66

Optical Class: Uniaxial (−). $\omega$ = 2.026-2.041 $\epsilon$ = 1.926-1.965 Pleochroism: O = dark blue with greenish tint; E = blue.

Cell Data: Space Group: $I4/mmm$. $a = 15.1007(2)$ $c = 24.4940(4)$ Z = 2

X-ray Powder Pattern: Boleo, Mexico.
2.392 (vs), 2.673 (s), 2.019 (s), 4.90 (ms), 3.76 (ms), 2.190 (ms), 1.888 (ms)

Chemistry:

$(1)$

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<table>
<thead>
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<tbody>
<tr>
<td>PbO</td>
<td>58.68</td>
</tr>
<tr>
<td>CuO</td>
<td>20.27</td>
</tr>
<tr>
<td>Cl</td>
<td>19.03</td>
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<tr>
<td>H$_2$O</td>
<td>5.90</td>
</tr>
<tr>
<td>$-\text{O} = \text{Cl}$</td>
<td>4.29</td>
</tr>
<tr>
<td>Total</td>
<td>99.59</td>
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</tbody>
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(1) Boleo, Mexico, recalculated analysis; corresponds to Cu$_{20.14}$Pb$_{20.78}$Cl$_{42.41}$(OH)$_{39.43}$·6.16H$_2$O.

Occurrence: A secondary mineral formed through reaction of chloride ions with primary sulfides in the oxidized zone of some Pb-Cu deposits; in smelter slag immersed in and leached by sea water. Of exhalative origin near a volcanic fumarole.

Association: Boleite, pseudoboleite, atacamite, anglesite, cerussite, phosgenite, gypsum (Mexico); tenorite, gypsum, cotunnite (Vesuvius).

Distribution: In Mexico, exceptional crystals and groups from the Amelia mine, Boleo, near Santa Rosalía, Baja California. From Laurium, Greece, in slag. Along Baratti Beach, Tuscany (in slag) and at Vesuvius (near a fumarole), Italy. In England, in Cornwall, from Tolcarne Beach, Great Western Beach, and Watergate Bay, Newquay; Newporth Beach, Falmouth; in the Porthilly mine, St. Minver; at Daymer Bay, near Polzeath; Trerubies Cove, near Delabole; Gunver Head, near Padstow Consols; and Loe Warren zawn, 0.75 km west of Botallack, St. Just. In Germany, from the Christian-Levin mine, near Essen, North Rhine-Westphalia. In Australia, at the Anticline prospect, 11 km west-southwest of Ashburton Downs homestead, Capricorn Range, Western Australia, and at Broken Hill, New South Wales.

Name: For Edouard Cumenge (1828-1902), French mining engineer at Boleo, Mexico, who found the first specimens.

Type Material: n.d.