Agardite-(Ce) $CeCu^{2+}_6(AsO_4)_3(OH)_6 \cdot 3H_2O$

Crystal Data: Hexagonal. *Point Group*: 6/*m*. As acicular crystals to 0.5 mm; commonly in radiating aggregates.

Physical Properties: *Cleavage*: None. *Fracture*: Conchoidal. *Tenacity*: [Brittle]. Hardness = ~3 D(meas.) = 3.70(5) D(calc.) = 3.775

Optical Properties: Transparent. *Color*: Light green to yellowish green. *Streak*: Greenish to pale yellow. *Luster*: Vitreous to silky.
Optical Class: Uniaxial (+). ω = 1.725(3) ε = 1.810(3) *Pleochroism*: *O* = yellow-green, *E* = green.

Cell Data: *Space Group*: $P6_3/m$. a = 13.598(6) c = 5.954(3) Z = 2

X-ray Powder Pattern: Clara mine, central Black Forest, Germany.
11.88 (10), 2.46 (9), 4.47 (8), 3.56 (8), 2.95 (8), 3.26 (5), 2.70 (5)

Chemistry:

	(1)
CaO	1.21
CuO	42.91
Fe_2O_3	0.39
Y_2O_3	0.91
La_2O_3	2.32
Ce_2O_3	4.99
Nd_2O_3	2.38
Sm_2O_3	0.56
Eu_2O_3	0.26
Gd_2O_3	0.52
Dy_2O_3	0.18
SiO_2	0.96
As_2O_5	30.91
SO_3	0.40
H_2O	[11.10]
Total	100.00

(1) Clara mine, central Black Forest, Germany; average electron microprobe analysis, H_2O by difference; corresponds to $(Ce_{0.33}Ca_{0.23}La_{0.15}Nd_{0.15}Y_{0.09}Sm_{0.03}Gd_{0.03}Eu_{0.02}Dy_{0.01})_{\Sigma=1.04}(Cu_{5.78}Fe_{0.05})_{\Sigma=5.83}(As_{2.88}Si_{0.17}S_{0.05})_{\Sigma=3.10}O_{12}(OH)_6 \cdot 3.60H_2O$.

Mineral Group: Mixite group.

Occurrence: In the oxidation zone of polymetallic sulfide deposits.

Association: Barite, quartz, goethite, cornwallite (Clara mine).

Distribution: From the Clara mine, near Oberwolfach, central Black Forest, Germany.

Name: By analogy to *agardite*-(Y), with a suffix for its rare-earth content dominated by *Ce*rium.

Type Material: Staatlichen Museum für Naturkunde, Stuttgart, Germany.

References: (1) Walenta, K. and T. Theye (2004) Agardite-(Ce) of the Clara mine in the central Black Forest. Aufschluss, 55, 17-23 (in German, English abs.). (2) (2004) Amer. Mineral., 89(10), 1574 (abs. ref. 1). (3) Aksenov, S.M., N.V. Chukanov, J. Göttlicher, S. Möckel, D. Varlamov, K.V. Van and R.K. Rastsvetaeva (2018) New insights into the crystal chemistry of agardite-(Ce): refinement of the crystal structure, hydrogen bonding, and epitaxial intergrowths with the Sb-analogue of auriacusite. Phys. Chem. Minerals 45, 39-50.