Arrheniusite-(Ce) $CaMg[(Ce_7Y_3)Ca_5](SiO_4)_3(Si_3B_3O_{18})(AsO_4)(BO_3)F_{11}$

Crystal Data: Hexagonal. *Point Group*: 3*m*. As anhedral grains to 0.8 mm.

Physical Properties: Cleavage: None. *Tenacity*: Brittle. *Fracture*: Conchoidal.
Hardness = ~5 (by analogy within the group). D(meas.) = n.d. D(calc.) = 4.78(1) Nonfluorescent.

Optical Properties: Translucent. *Color*: Greenish yellow. *Streak*: n.d. *Luster*: Vitreous.
Optical Class: Uniaxial (-). ω = 1.750(5) ε = 1.725(5) Non-pleochroic.

Cell Data: *Space Group*: *R*3*m*. *a* = 10.8082(3) *c* = 27.5196(9) Z = 3

X-ray Powder Pattern: Östanmossa mine, Norberg Municipality, Västmanland County, Sweden.
3.010 (100), 2.976 (70), 3.146 (51), 2.702 (46), 4.431 (43), 2.954 (32), 7.739 (24)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	14.49	13.87	Tm_2O_3	[0.03]	
Al_2O_3	0.07		Yb_2O_3	0.05	
Y_2O_3	11.82	13.03	CaO	9.51	12.94
La_2O_3	5.38		MgO	0.86	1.55
Ce_2O_3	13.97	44.18	FeO	0.78	
Pr_2O_3	2.29		PbO	0.02	
Nd_2O_3	13.38		P_2O_5	0.31	
Sm_2O_3	4.49		As_2O_5	[3.23]	4.42
Gd_2O_3	4.91		As_2O_3	[1.30]	
Tb_2O_3	0.51		B_2O_3	4.70	5.35
Dy_2O_3	1.79		F	7.93	8.04
Ho_2O_3	0.27		-O = F	3.34	3.38
Er_2O_3	0.77		Total	99.86	100.00

(1) Östanmossa mine, Norberg Municipality, Västmanland County, Sweden; average electron microprobe and Raman spectroscopic analyses, As^{3+}:As^{5+} calculated from structure; corresponds to $(Ca_{0.65}As^{3+}_{0.35})_{\Sigma=1}(Mg_{0.57}Fe^{2+}_{0.30}As^{5+}_{0.10}Al_{0.03})_{\Sigma=1}[(Ce_{2.24}Nd_{2.13}La_{0.86}Gd_{0.74}Sm_{0.71}Pr_{0.37})_{\Sigma=7.0}(Y_{2.76}Dy_{0.26}Er_{0.11}Tb_{0.08}Tm_{0.01}Ho_{0.04}Yb_{0.01})_{\Sigma=3.27}Ca_{4.14}]_{\Sigma=14.46}(SiO_4)_3[(Si_{3.26}B_{2.74})_{\Sigma=6}O_{17.31}F_{0.69}][(As^{5+}_{0.65}Si_{0.22}P_{0.13})_{\Sigma=1}O_4](B_{0.77}O_3)F_{11}$. (2) $CaMg[(Ce_7Y_3)Ca_5](SiO_4)_3(Si_3B_3O_{18})(AsO_4)(BO_3)F_{11}$.

Mineral Group: Vicanite group. The Mg-As analogue of hundholmenite-(Y)

Occurrence: In a Bastnäs-type, rare-earth element (*REE*) deposit in a metasomatic F-rich skarn.

Association: Dolomite, tremolite, talc, magnetite, calcite, pyrite, dollaseite-(Ce), parisite-(Ce), bastnäsite-(Ce), fluorbritholite-(Ce), gadolinite-(Nd).

Distribution: From the Östanmossa mine, Norberg Municipality, Västmanland County, Sweden.

Name: Honors Carl Axel *Arrhenius* (1757-1824), a Swedish officer and chemist, who discovered the first *REE*-bearing mineral, later named gadolinite-(Y), at the Ytterby pegmatite quarry. The suffix indicates the dominant *REE*.

Type Material: Department of Geosciences, Swedish Museum of Natural History, Stockholm, Sweden (GEO-NRM #19540155).

References: (1) Holtstam, D., L. Bindi, P. Bonazzi, H.J. Förster, and U.B. Andersson (2021) Arrheniusite-(Ce), $CaMg[(Ce_7Y_3)Ca_5](SiO_4)_3(Si_3B_3O_{18})(AsO_4)(BO_3)F_{11}$, a new member of the vicanite group, from the Östanmossa mine, Norberg, Sweden. Can. Mineral., 59, 177-189.
(2) (2022) Amer. Mineral., 107, 318-319 (abs. ref. 1).