

Arisite-(Ce)**NaCe₂(CO₃)₂[F_{2-x}(CO₃)_{1-x}]F**

Crystal Data: Hexagonal. *Point Group:* $\bar{6} m2$. As hexagonal micaceous plates to 1.5 mm and as hexagonal tabular prisms {100}. Also in rosettes and spherical aggregates. *Twinning:* Reentrant angles observed of an unidentified twin law.

Physical Properties: *Cleavage:* Poor on {001}. *Fracture:* Conchoidal. *Tenacity:* Brittle, flexible. $D(\text{meas.}) = > 3.3$ $D(\text{calc.}) = 4.126$ *Hardness* = 3-3.5 Effervesces in dilute HCl.

Optical Properties: Transparent. *Color:* Beige, beige-yellow, light lemon-yellow to pinkish, silvery. *Streak:* White. *Luster:* Vitreous.
Optical Class: Uniaxial (-). $\omega = 1.696\text{--}1.714(4)$ $\varepsilon = 1.594\text{--}1.611(3)$

Cell Data: *Space Group:* $P\bar{6} m2$. $a = 5.1109(2)$ $c = 8.6713(4)$ $Z = 1$

X-ray Powder Pattern: Ariskop and Railroad (Aris phonolite) quarry, central Namibia. 4.439(100), 3.103(87), 4.352(52), 1.9748(42), 2.561(38), 2.424(21), 1.9501(16)

Chemistry:	(1)	(2)		(1)	(2)
Na ₂ O	5.89	4.49	Sm ₂ O ₃	0.47	0.69
CaO	1.51	5.39	Gd ₂ O ₃	0.01	0.54
SrO	0.11	2.78	CO ₂	[23.40]	[20.92]
La ₂ O ₃	25.47	15.56	F	5.93	9.62
Ce ₂ O ₃	29.80	30.71	<u>-O=F</u>	<u>2.50</u>	<u>4.05</u>
Pr ₂ O ₃	1.43	3.05	Total	95.26	97.90
Nd ₂ O ₃	3.54	8.12			

(1) Namibia; average of 6 electron microprobe analyses supplemented by TGA-DTA for CO₂; corresponds to (Na_{0.97}Ca_{0.03}) $\Sigma=1.00$ (Ce_{0.92}La_{0.80}Nd_{0.11}Pr_{0.04}Sm_{0.01}Ca_{0.09}) $\Sigma=1.97$ (CO₃)₂[(CO₃)_{0.71}F_{0.59}]F.

(2) Mont Saint-Hilaire, Canada; average of 3 electron microprobe analyses supplemented by IR spectroscopy and TGA-DTA; corresponds to (Na_{0.70}Ca_{0.30}) $\Sigma=1.00$ (Ce_{0.90}La_{0.49}Nd_{0.23}Pr_{0.09}Sm_{0.02}Gd_{0.01}Ca_{0.16}Sr_{0.13}) $\Sigma=2.03$ (CO₃)₂[F_{1.43}(CO₃)_{0.28}]F.

Occurrence: A late-stage, post-magmatic to hydrothermal mineral in miarolitic cavities in small alkaline pegmatite veins and lenticular patches within syenite and syenite sodalite xenoliths in phonolite of an alkaline intrusive complex (Mont Saint-Hilaire).

Association: Villiaumite, aegirine, labuntsovite-group minerals, taperssuatsiaite, natrolite, analcime, manganoneptunite, apophyllite-(KF), fluorite, makatite (Namibia); natrolite, aegirine, albite, manganoneptunite, rhodochrosite, sphalerite, astrophyllite (Saint-Amable); aegirine, albite, a clinopyroxene, a eudialyte-group mineral, microcline, mosandrite, natrolite, gonnardite, fluorapatite (Mont Saint-Hilaire pegmatite); aegirine, "tetranatrolite", polyolithionite, fluorite, sodalite, serandite, microcline, catapleiite, pyrite, pyrochlore, pyrrhotite, goethite, an alkali feldspar, an astrophyllite-group mineral (Mont Saint-Hilaire sodalite syenite xenoliths).

Distribution: From the Ariskop and Railroad (Aris phonolite) quarry, central Namibia; and in Quebec, Canada from Mont Saint-Hilaire and the Varennes quarry (Saint-Amable sill), Verchères County.

Name: For the *Aris* phonolite, Namibia, and the dominant rare earth element, *Ce*.

Type Material: Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 86067 and CMNMC 86068).

References: (1) Piilonen, P.C., A.M. McDonald, J.D. Grice, R. Rowe, R.A. Gault, G. Poirier, M.A. Cooper, U. Kolitsch, A.C. Roberts, W. Lechner, and A.G. Palfi (2010) Arisite-(Ce), a new rare-earth fluorocarbonate from the Aris phonolite, Namibia, Mont Saint-Hilaire and the Saint-Amable sill, Quebec, Canada. *Can. Mineral.*, 48, 661-671. (2) (2011) *Amer. Mineral.*, 96, 936-937 (abs. ref. 1).