Reederite-(Y) $Na_{15-x}(Y,Ce)_2(CO_3)_9(SO_3F)(Cl,F)$

Crystal Data: Hexagonal. *Point Group:* $\overline{6}$. Tabular to blocky grains, to 2 mm.

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 3–3.5 D(meas.) = 2.91(3) D(calc.) = 2.85

Optical Properties: Transparent. *Color:* Yellow to orange-brown. *Streak:* White. *Luster:* Vitreous.
Optical Class: Uniaxial (–), may be anomalously biaxial (–). $\omega = 1.548(1)$ $\epsilon = 1.537(1)$ 2V(meas.) = 15°

Cell Data: *Space Group:* $P\overline{6}$. $a = 8.763(1)$ $c = 10.736(2)$ Z = 1

X-ray Powder Pattern: Mont Saint-Hilaire, Canada.
2.532 (100), 4.39 (80), 2.774 (80), 2.240 (80), 6.20 (40), 2.067 (30), 3.801 (20)

Chemistry:

	(1)		(1)
SO_3	5.07	Er_2O_3	1.19
CO_2	[31.91]	Yb_2O_3	0.37
Al_2O_3	1.31	FeO	0.42
Y_2O_3	10.24	MnO	1.23
La_2O_3	1.39	CaO	0.70
Ce_2O_3	3.54	Na_2O	34.04
Pr_2O_3	0.36	F	1.86
Nd_2O_3	1.99	Cl	2.05
Sm_2O_3	0.52	$-O = (F,Cl)_2$	1.24
Gd_2O_3	0.80	Total	[99.14]
Dy_2O_3	1.39		

(1) Mont Saint-Hilaire, Canada; by electron microprobe, average of ten analyses, total Fe as FeO, total Mn as MnO, presence of $(CO_3)^{2-}$ confirmed by IR, calculated from stoichiometry and crystal-structure analysis; corresponds to $(Na_{13.63}Al_{0.32}Mn_{0.22}Ca_{0.16}Fe_{0.07})_{\Sigma=14.40}(Y_{1.13}Ce_{0.27}Nd_{0.15}La_{0.11}Dy_{0.09}Er_{0.08}Gd_{0.06}Sm_{0.04}Pr_{0.03}Yb_{0.02})_{\Sigma=1.98}(CO_3)_{9.00}(SO_3F)_{0.79}(Cl_{0.72}F_{0.43})_{\Sigma=1.15}O_{0.74}$.

Occurrence: A very rare mineral in a sodalite xenolith in syenite in an intrusive alkalic gabbro-syenite complex.

Association: Trona, shortite, petersenite-(Ce), catapleiite, analcime, manganotychite.

Distribution: From Mont Saint-Hilaire, Quebec, Canada.

Name: To honor Dr. Richard James Reeder (1953–), Professor of Geochemistry, State University of New York, Stony Brook, New York, USA, for his contributions to carbonate mineralogy.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 81520.

References: (1) Grice, J.D., R.A. Gault, and G.Y. Chao (1995) Reederite-(Y), a new sodium rare-earth carbonate mineral with a unique fluorosulfate anion. Amer. Mineral., 80, 1059–1064.