Reederite-(Y) \[ \text{Na}_{15-x}(Y, \text{Ce})_2(\text{CO}_3)_9(\text{SO}_3\text{F})(\text{Cl, F}) \]

Crystal Data: Hexagonal. Point Group: \( \bar{6} \). 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: \( P\bar{6} \). \( a = 8.763(1) \) \( c = 10.736(2) \) \( Z = 1 \)

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:

\[
\begin{array}{ccc}
\text{SO}_3 & 5.07 & \text{Er}_2\text{O}_3 & 1.19 \\
\text{CO}_2 & 31.91 & \text{Yb}_2\text{O}_3 & 0.37 \\
\text{Al}_2\text{O}_3 & 1.31 & \text{FeO} & 0.42 \\
\text{Y}_2\text{O}_3 & 10.24 & \text{MnO} & 1.23 \\
\text{La}_2\text{O}_3 & 1.39 & \text{CaO} & 0.70 \\
\text{Ce}_2\text{O}_3 & 3.54 & \text{Na}_2\text{O} & 34.04 \\
\text{Pr}_2\text{O}_3 & 0.36 & \text{F} & 1.86 \\
\text{Nd}_2\text{O}_3 & 1.99 & \text{Cl} & 2.05 \\
\text{Sm}_2\text{O}_3 & 0.52 & -\text{O} = (\text{F, Cl})_2 & 1.24 \\
\text{Gd}_2\text{O}_3 & 0.80 & \text{Total} & [99.14] \\
\text{Dy}_2\text{O}_3 & 1.39 & \\
\end{array}
\]

(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 \((\text{Na}_{1.13}\text{Al}_{0.22}\text{Mn}_{0.02}\text{Ca}_{0.02}\text{Fe}_{0.07})_{1.4} = 1.40\) \((\text{Y}_{1.13}\text{Ce}_{0.27}\text{Nd}_{0.15}\text{La}_{0.11}\text{Dy}_{0.09}\text{Er}_{0.08}\text{Gd}_{0.06}\text{Sm}_{0.04}\text{Pr}_{0.03}\text{Yb}_{0.02})_{1.98} = 1.98\) \((\text{CO}_3)_{9.00}\text{SO}_3\text{F})_{0.79}\) \((\text{Cl}_{0.07}\text{F}_{0.43})_{1.15}\) \((\text{O}_{0.74})\).

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

Association: Trona, shortite, petersonite-(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.