Cossaite \((\text{Mg}_{0.5},\square)\text{Al}_6(\text{SO}_4)_6(\text{HSO}_4)\text{F}_6\cdot 36\text{H}_2\text{O}\)

Crystal Data: Hexagonal. \textit{Point Group}: \(\overline{3} \). As stout prismatic crystals terminated by rhombohedral faces, to 0.1 mm.


Hardness = n.d. \quad D(\text{meas.}) = 2.08 \quad D(\text{calc.}) = 2.075


Optical Class: n.d. \quad n = 1.49(1)

Cell Data: \textit{Space Group}: \(R\overline{3} \). \quad a = 22.010(2) \quad c = 9.238(1) \quad Z = 3

X-ray Powder Pattern: La Fossa crater, Vulcano, Aeolian Islands, Sicily, Italy.

4.15 (100), 3.87 (70), 11.00 (50), 4.58 (25), 2.770 (20), 2.166 (20), 2.345 (17)

Chemistry:
\[
\begin{array}{ll}
\text{MgO} & 1.4 \\
\text{Al}_2\text{O}_3 & 19.5 \\
\text{SO}_3 & 34.7 \\
\text{F} & 5.7 \\
\text{H}_2\text{O} & 40.85 \\
\text{-O=F} & 2.4 \\
\text{Total} & 99.75 \\
\end{array}
\]

(1) La Fossa crater, Vulcano, Aeolian Islands, Sicily, Italy; average of 6 electron microprobe analyses, \(\text{H}_2\text{O}\) from structural analysis; corresponding to \(\text{Mg}_{0.56}\text{Al}_{6.19}\text{S}_{7.01}\text{H}_{73.37}\text{F}_{4.85}\text{O}_{65.15}\).

Occurrence: A rare phase formed at approximately 350\(^{\circ}\)C by vapor alteration of volcanic breccia in a strongly acidic, fluorine-rich environment.

Association: Thermessaite, vlodavetsite, sassolite, salammoniac.

Distribution: From the rim of the La Fossa crater, Vulcano, Aeolian Islands, Sicily, Italy.

Name: Honors Alfonso Cossa (1833–1902), an Italian chemist and mineralogist.

Type Material: Reference Collection of the Dipartimento di Chimica Strutturale e Stereo chimica Inorganica, Universita' degli Studi, Milan, Italy; 2009-1.

References: (1) Demartin, F., C.M. Gramaccioli, I. Campostrini, and C. Castellano (2011) Cossaite, (\text{Mg}_{0.5},\square)\text{Al}_6(\text{SO}_4)_6(\text{HSO}_4)\text{F}_6\cdot 36\text{H}_2\text{O}, a new mineral from La Fossa crater, Vulcano, Aeolian Islands, Italy. Mineral. Mag., 75(6), 2847-2855. (2) (2013) Amer. Mineral., 98, 1078-1079 (abs. ref. 1).