Acmonidesite $(NH_4, K, Pb^{2+}, Na)_9Fe^{2+}_4(SO_4)_5Cl_8$

Crystal Data: Orthorhombic. *Point Group*: 222. As well-formed prismatic crystals to 0.1 mm that display {100}, {120}, {011}, {010}, and {102}.

Physical Properties: *Cleavage*: None. *Fracture*: n.d. *Tenacity*: n.d. Hardness = n.d. D(meas.) = 2.56(1) D(calc.) = 2.551

Optical Properties: Transparent. *Color*: Brown; intense brown in transmitted light. S*treak*: Light brown. *Luster*: Vitreous.
Optical Class: Biaxial (+). $\alpha = 1.580(2)$ $\beta = 1.590(2)$ $\gamma = 1.635(2)$ 2V(meas.) = 53(3)° 2V(calc.) = 51.6° *Orientation*: $X = c$, $Y = b$, $Z = a$.

Cell Data: Space Group: $C222_1$. $a = 9.841(1)$ $b = 19.448(3)$ $c = 17.847(3)$ Z = 4

X-ray Powder Pattern: La Fossa crater, Vulcano, Aeolian Islands, Sicily, Italy.
8.766 (100), 1.805 (88), 5.178 (45), 4.250 (42), 2.926 (42), 9.049 (37), 2.684 (32)

Chemistry:

	(1)
$(NH_4)_2O$	[11.05]
K_2O	4.91
Na_2O	2.82
FeO	20.93
MnO	0.42
PbO	10.25
SO_3	29.67
Cl	20.80
Br	0.45
$-O = Cl_2$	4.75
Total	96.55

(1) La Fossa crater, Vulcano, Aeolian Islands, Sicily, Italy; average of 8 EDS analyses supplemented by FTIR spectroscopy, $(NH_4)_2O$ calculated from structure; corresponds to $(NH_4)_{5.77}K_{1.42}Pb_{0.62}Na_{1.24}Fe^{2+}_{3.96}Mn_{0.08}S_{5.04}O_{20.16}Cl_{7.97}Br_{0.08}$.

Occurrence: A fumarolic sublimate on pyroclastic breccia.

Association: Salammoniac, alunite, adranosite.

Distribution: From fumarole FA (~250 °C) at La Fossa crater, Vulcano, Aeolian Islands, Sicily, Italy.

Name: For *Acmonides* one of Ovidius' Cyclops, helpers of Hephaistos, the mythological god of fire whose forge was alleged to be located at Vulcano.

Type Material: Reference Collection, Department of Chemistry, University of Milan, Italy (2013-02).

References: (1) Demartin, F., C. Castellano, and I. Campostrini (2019) Acmonidesite, a new ammonium sulfate chloride from La Fossa crater, Vulcano, Aeolian Islands, Italy. Mineral. Mag. 83(1), 137-142. (2) (2020) Amer. Mineral., 105(10), 1598 (abs. ref. 1).