Pyracmonite $(NH_4)_3Fe(SO_4)_3$

Crystal Data: Hexagonal. *Point Group*: 3*m*. As prismatic hexagonal crystals, to 0.2 mm.

Physical Properties: *Cleavage*: None. F*racture*: n.d. *Tenacity*: n.d. *Hardness* = 2
D(meas.) = 2.22(1) D(calc.) = 2.228

Optical Properties: Transparent to translucent. *Color*: Colorless to white. *Streak*: White. *Luster*: Vitreous.
Optical Class: Uniaxial (-). *n*(calc.) = 1.562(3)

Cell Data: *Space Group*: *R*3*c*. *a* = 15.2171(14) *c* = 8.9323(8) Z = 6

X-ray Powder Pattern: La Fossa crater, Vulcano, Aeolian Islands, Italy.
7.596 (100), 3.320 (30), 3.371 (26), 4.358 (23), 2.829 (14), 2.863 (8), 4.384 (5)

Chemistry:

	(1)	(2)
$(NH_4)_2O$	17.85	19.62
K_2O	2.77	
Fe_2O_3	18.70	20.05
Al_2O_3	0.50	
SO_3	60.47	60.33
Total	100.29	100.00

(1) La Fossa crater, Vulcano, Aeolian Islands, Italy; average of 12 EDS analyses supplemented by IR spectroscopy; corresponds to $[(NH_4)_{2.74}K_{0.23}]_{\Sigma=2.97}(Fe_{0.94}Al_{0.04})_{\Sigma=0.98}S_{3.02}O_{12}$. (2) $(NH_4)_3Fe(SO_4)_3$.

Occurrence: A sublimate on pyroclastic breccia in an intercrater volcanic fumarole (~250 °C) (Italy); a sublimate from a natural fire in an oil-bearing shale (Ohio).

Association: Salammonic, kremersite, $(NH_4)_2Fe^{3+}Cl_5 \cdot H_2O$ (Italy); sabieite, tschermigite, voltaite (Ohio).

Distribution: From the La Fossa crater, Vulcano, Aeolian Islands, Italy and from near Milan, Ohio, USA.

Name: From the Greek for "fire" and "anvil", in allusion to the mythical Hephaistos's workshop, which allegedly was located on the Island of Vulcano.

Type Material: University of Milan, Italy (#2008–04).

References: (1) Demartin, F., C.M. Gramaccioli, and I. Campostrini (2010) Pyracmonite, $(NH_4)_3Fe(SO_4)_3$, a new ammonium iron sulfate from La Fossa crater, Vulcano, Aeolian Islands, Italy. Can. Mineral., 48, 307-313. (2) (2011) Amer. Mineral., 96, 943-944 (abs. ref. 1).
(3) Kampf, A.R., Richards, R.P., Nash, B.P. (2014): The 2H and 3R polytypes of sabieite, $NH_4Fe^{3+}(SO_4)_2$, from a natural fire in an oil-bearing shale near Milan, Ohio. American Mineralogist, 99, 1500-1506.