Lonecreekite $(NH_4)(Fe^{3+}, Al)(SO_4)_2 \cdot 12H_2O$

Crystal Data: Cubic. *Point Group:* $2/m\ \overline{3}$. Xenomorphic crystals, to 0.1 mm, aggregated in sugary crusts and efflorescences.

Physical Properties: Hardness = "Very soft". D(meas.) = 1.693 D(calc.) = 1.691
Soluble in H_2O, leaving brown $Fe(OH)_3$; dehydrates to sabieite.

Optical Properties: Transparent. *Color:* Colorless to white. *Luster:* Vitreous.
Optical Class: Isotropic. $n = 1.483$

Cell Data: *Space Group:* $Pa3$. $a = 12.302$ $Z = 4$

X-ray Powder Pattern: Lone Creek Fall Cave, South Africa.
4.356 (100), 7.12 (70), 3.289 (65), 4.107 (60), 5.505 (50), 5.027 (25), 1.945 (20)

Chemistry:

	(1)
SO_3	33.49
Al_2O_3	1.69
Fe_2O_3	13.04
K_2O	0.02
$(NH_4)_2O$	5.34
H_2O	45.60
insol.	0.77
Total	99.95

(1) Lone Creek Fall Cave, South Africa; corresponds to $(NH_4)_{0.99}(Fe_{0.79}Al_{0.16})_{\Sigma=0.95}(S_{1.01}O_4)_2 \cdot 12.25H_2O$.

Occurrence: A rare secondary mineral probably formed by alteration of pyrite and reaction, at pH < 1, with ammonia fumes produced as the result of decay of organic matter (*Hyrax* excreta).

Association: Clairite, sabieite, tschermigite.

Distribution: On the ceiling of Lone Creek Fall Cave, near Sabie, Eastern Transvaal, South Africa.

Name: For Lone Creek Fall Cave, South Africa, its original occurrence.

Type Material: South African Geological Survey Museum, Pretoria, South Africa, LCH002.

References: (1) Martini, J.E.J. (1983) Lonecreekite, sabieite, and clairite, new secondary ammonium ferric-iron sulphates from Lone Creek Fall Cave, near Sabie, Eastern Transvaal. Ann. Geol. Surv. S. Africa, 17, 29–34. (2) (1986) Amer. Mineral., 71, 229 (abs. ref. 1).