

Ammoniomagnesiovoltaite

Crystal Data: Isometric. *Point Group:* $4/m\bar{3}2/m$. As crusts of intergrown equant crystals to 0.05 mm, displaying {111}, {100} and minor {110}.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. *Hardness* = 2-3
D(meas.) = 2.55(1) [value ascribed to analytical error] *D(calc.)* = 2.351 Dissolves in water.

Optical Properties: Translucent. *Color:* Pale yellow to yellow-brown. *Streak:* White.
Luster: Vitreous.
Optical Class: Isotropic. $n = 1.60(1)$

Cell Data: *Space Group:* $Fd\bar{3}c$. $a = 27.260(2)$ $Z = 16$

X-ray Powder Pattern: Synthetic $(\text{NH}_4)_2\text{Mg}_5\text{Fe}^{3+}_3\text{Al}(\text{SO}_4)_{12}\cdot 18\text{H}_2\text{O}$.
 5.59 (100), 3.420 (72), 3.562 (66), 1.7836 (25), 1.5582 (25), 6.85 (24), 3.059 (22)

Chemistry:	(1)	(2)
SO ₃	47.56	52.52
Al ₂ O ₃	3.31	2.79
FeO (total)	16.99	
Fe ₂ O ₃	[12.28]	13.09
FeO	[5.94]	
MnO	1.18	
MgO	7.02	11.02
K ₂ O	0.05	
(NH ₄) ₂ O	3.11	2.85
H ₂ O	[17.72]	17.73
Total	98.17	100.00

(1) Köves Hill, Pécs-Vasas, Southern Hungary; average of 5 electron microprobe analyses, H₂O calculated from stoichiometry, (NH₄)₂O by spectrophotometry, presence of H₂O, (SO₄)²⁻, (NH₄)⁺ confirmed by IR spectroscopy, Fe²⁺ and Fe³⁺ determined assuming (Mg+Fe²⁺+Mn²⁺)/(Fe³⁺+Al) = 5/4; corresponding to [(NH₄)_{2.18}K_{0.02}]_{Σ=2.20}(Mg_{3.19}Fe²⁺_{1.51}Mn_{0.30})_{Σ=5.00}(Fe³⁺_{2.81}Al_{1.19})_{Σ=4.00}S_{10.87}O_{44.70}•18H₂O. (2) (NH₄)₂Mg₅Fe³⁺₃Al(SO₄)₁₂•18H₂O.

Mineral Group: Voltaite group.

Occurrence: As efflorescences formed by the chemical reactions as ground water interacts with organic matter from coal and oxidizing pyrite and marcasite on a burning coal dump.

Association: Tschermigite, sabieite, kieserite, pickeringite, hexahydrate.

Distribution: From near Köves Hill, Pécs-Vasas, Mecsek Mountains, Southern Hungary.

Name: As an analog of *voltaite* with essential ammonium and magnesium in the composition.

Type Material: In Hungary at the Herman Ottó Museum, Miskolc, (# 2008.233) and at the Department of Mineralogy and Petrology, Hungarian Natural History Museum, Budapest (Gyn.1590).

References: (1) Szakáll, S., I. Sajó, B. Fehér, and S. Bigi (2012) Ammoniomagnesiovoltaite, a new voltaite-related mineral species from Pécs-Vasas, Hungary. *Can. Mineral.*, 50(1), 65-72. (2) (2014) *Amer. Mineral.*, 99, 2150 (abs. ref. 1).