

Ammonioalunite



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Crystal Data: Hexagonal. *Point Group:* $\bar{3} 2/m$ or $3m$. As rhombohedral crystals, to 20 μm , forming granular masses.

Physical Properties: *Cleavage:* On $\{0001\}$, perfect.] (by analogy with the alunite group).
Hardness = 2–3 D(meas.) = 2.4 D(calc.) = 2.58

Optical Properties: Semitransparent. *Color:* Grayish white; colorless in thin section.
Streak: White. *Luster:* Vitreous.
Optical Class: Uniaxial (+). $\omega = 1.590(5)$ $\epsilon = 1.602(5)$

Cell Data: *Space Group:* $R\bar{3}m$ or $R3m$. $a = 7.013(1)$ $c = 17.855(5)$ $Z = 3$

X-ray Powder Pattern: The Geysers, California, USA.
3.023 (100), 5.04 (93), 2.996 (50), 1.917 (32), 2.353 (31), 1.753 (21) 3.514 (19)

Chemistry:	(1)	(2)	(3)
SO ₃	35.96	41.35	40.73
SiO ₂	11.6		
Al ₂ O ₃	33.0	37.95	38.90
(NH ₄) ₂ O	5.39	6.20	6.62
Na ₂ O	0.17	0.20	
K ₂ O	0.19	0.22	
H ₂ O	12.24	14.08	13.75
Total	98.6	[100.00]	100.00

(1) The Geysers, California, USA; by inductively coupled Ar-plasma spectrometry, S by a Leco S analyzer, K by AA, and H and N by a CHN analyzer. (2) Do.; analysis (1) recalculated after deduction of amorphous SiO₂; corresponds to $[(\text{NH}_4)_{0.92}\text{Na}_{0.02}\text{K}_{0.02}]_{\Sigma=0.96}\text{Al}_{2.88}(\text{SO}_4)_{2.00}(\text{OH})_{5.60} \cdot 0.23\text{H}_2\text{O}$. (3) $(\text{NH}_4)\text{Al}_3(\text{SO}_4)_2(\text{OH})_6$.

Mineral Group: Alunite group.

Occurrence: Formed in hot springs under very acid conditions, rich in ammonium and sulfate, poor in potassium, below 100 °C.

Association: Ammoniojarosite, amorphous SiO₂.

Distribution: From The Geysers, Sonoma Co., California, USA.

Name: As the *ammonium* analog of *alunite*.

Type Material: National Museum of Natural History, Washington, D.C., USA, 145596.

References: (1) Altaner, S.P., J.J. Fitzpatrick, M.D. Krohn, P.M. Bethke, D.O. Hayba, J.A. Goss, and Z.A. Brown (1988) Ammonium in alunites. *Amer. Mineral.*, 73, 145–152.