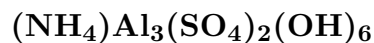


## Ammonioalunite



©2001-2005 Mineral Data Publishing, version 1

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$  or  $3m$ . As rhombohedral crystals, to 20  $\mu\text{m}$ , 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 <sub>3</sub>	35.96	41.35	40.73
SiO <sub>2</sub>	11.6		
Al <sub>2</sub> O <sub>3</sub>	33.0	37.95	38.90
(NH <sub>4</sub> ) <sub>2</sub> O	5.39	6.20	6.62
Na <sub>2</sub> O	0.17	0.20	
K <sub>2</sub> O	0.19	0.22	
H <sub>2</sub> 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 SiO<sub>2</sub>; 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 SiO<sub>2</sub>.

**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.