

THE SYSTEM OF
MINERALOGY

*of James Dwight Dana and Edward Salisbury Dana
Yale University 1837-1892*

SEVENTH EDITION
Entirely Rewritten and Greatly Enlarged

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VOLUME II

HALIDES, NITRATES, BORATES, CARBONATES,
SULFATES, PHOSPHATES, ARSENATES, TUNGSTATES,
MOLYBDATES, ETC.

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On the growth rate of various faces see Spangenberg, *Zs. Kr.*, **61**, 189 (1925); *Jb. Min., Beil.-Bd.*, **57**, 1197 (1928), and Valetton, *Zs. Kr.*, **56**, 434 (1921).

3. On the variation of hardness with direction see Pfaff, *Sitzber. bayer. Ak. Wiss.*, **255** (1884).

4. Indices of Soret, *Arch. sc. phys. nat. Genève*, **12**, 376 (1884) on artificial crystals.

5. Wendekamm, *Zs. Kr.*, **85**, 169 (1933).

6. For description and interpretation see Brauns, *Die opt. Anom. der Kristalle*, Leipzig, 1891, and *Jb. Min.*, **II**, 102 (1883), **I**, 96 (1885); Klocke, *Jb. Min.*, **I**, 56 (1880), **II**, 267 (1881); Beckenkamp, *Zs. Kr.*, **51**, 492 (1913); Pockels, *Jb. Min., Beil.-Bd.*, **8**, 217 (1892).

7. See Bauhans, *Verh. Nat. Ver. Heidelberg*, **12**, 319 (1913); Klocke, *Zs. Kr.*, **2**, 126 (1878); Wulff, *Zs. Kr.*, **5**, 81 (1881); Friedel, *C.R.*, **179**, 796 (1924).

8. Alfani, *Per. Min.*, **4**, 395 (1933).

9. On the system $K_2SO_4-Al_2(SO_4)_3-H_2O$ see Britton, *J. Chem. Soc. London*, **121**, 982 (1922).

10. For dehydration data see Spangenberg and Baldermann-Fiola, *Jb. Min., Monatsh., Abt. A*, 113 (1949).

29.5.5.2 **SODA ALUM** $[NaAl(SO_4)_2 \cdot 12H_2O]$. Soda Alum pt., Natronalaun pt. *older authors*. Mendozite pt. *Dana* (653, 1868). Sodalumite *Winchell* (259, 1931).

C r y s t. Isometric; diploidal— $2/m\bar{3}$.

Forms:

(artificial) $o\ 111$ $a\ 001$

Structure cell.¹ Space group $Pa\bar{3}$. $a_0\ 12.19 \pm 0.02\ kX$. Cell contents $Na_4Al_4(SO_4)_3 \cdot 48H_2O$. Soda alum is not isostructural with potash alum.

Habit. Artificial crystals are octahedral.

Phys. Fracture conchoidal. $H. \sim 3$. $G. 1.67$. Luster vitreous. Colorless and transparent.

Opt.² In transmitted light, colorless. Isotropic.

λ	$B(686m\mu)$	$C(656m\mu)$	$D(589m\mu)$	$E(527m\mu)$	$F(486m\mu)$	$G(431m\mu)$
n	1.4356	1.4365	1.4388	1.4418	1.4441	1.4480

Chem. A hydrated sulfate of sodium and aluminum, $NaAl(SO_4)_2 \cdot 12H_2O$. Analyses of natural material known to belong to this species are lacking. K does not substitute for Na to a significant extent.⁴

Tests. Soluble in water (110 g. of the anhydrous salt in 100 ml. of water at 15°). Fuses in its water of crystallization at about 63° . Loses $6H_2O$ at about 50° , forming tamarugite.

Occur. The name soda alum is here applied to the isometric compound $NaAl(SO_4)_2 \cdot 12H_2O$. A number of occurrences of NaAl alum in nature have been reported (see *mendozite*), but none can be referred with certainty to the present species.

Artif.³ As crystals from a water solution of the component salts. Soda alum crystallizes with more difficulty than potash alum.

Ref.

1. Lipson, *Proc. Roy. Soc. London*, **151A**, 347 (1935).
2. Soret, *Arch. sc. phys. nat. Genève*, **13**, 9 (1885), on artificial crystals.
3. Dobbins and Addleston, *J. Phys. Chem.*, **39**, 637 (1935), and Mellor (**5**, 342, 1924).
4. Krickmeyer, *Zs. phys. Chem.*, **21**, 78 (1896).