



>>Entry Name: Aluminium phosphate ($\text{Al}(\text{H}_2\text{PO}_4)_3$)

Synonym(s): Aluminium phosphate (1:3), 9Cl, 8Cl. Aluminium tris(dihydrogen phosphate)

CAS Registry Number: 13530-50-2

$\text{Al}(\text{H}_2\text{PO}_4)_3$

Molecular Formula: $\text{AlH}_6\text{O}_{12}\text{P}_3$

Molecular Weight: 317.943

Accurate Mass: 317.888755

Percentage Composition: Al 8.49%; H 1.90%; O 60.39%; P 29.23%

Source/Synthesis: Synth. from $\text{Al}(\text{OH})_3 + \text{H}_3\text{PO}_4$; $\text{Al} + \text{H}_3\text{PO}_4$; $\text{Al}_2\text{O}_3 + \text{H}_3\text{PO}_4$ at $<300^\circ$

Use/Importance: Employed in binders eg. for glazes; metal coatings; dental cements

Physical Description: V. hygroscopic colourless hexagonal prisms

Melting Point: Mp 243°

Other Data: When heated forms condensed Al phosphates via an amorphous form produced at $230\text{--}290^\circ$. Many similar compds. $\text{Al}(\text{H}_2\text{PO}_4)_x(\text{HPO}_4)_y(\text{H}_2\text{O})_z$ descr.

Fluka: 6234

>>Derivative: Dihydrate

CAS Registry Number: 124606-61-7

Source/Synthesis: Synth. from $\text{Al}_2\text{O}_3\text{--P}_2\text{O}_5\text{--H}_2\text{O}$ system

>>Variant: (1)-form

Molecular Formula: $\text{AlH}_6\text{O}_{12}\text{P}_3$

Molecular Weight: 317.943

Accurate Mass: 317.888755

Percentage Composition: Al 8.49%; H 1.90%; O 60.39%; P 29.23%

General Statement: Rhombohedral cell. Isolated AlO_6 octahedra are stacked with corner-sharing PO_4 tetrahedra, and the columns are linked by H bonds

Physical Description: V. hygroscopic prisms

Melting Point: Mp 243°

Other Data: Undergoes phase transition at 60° with proton reorientation

>>Variant: (2)-form

Molecular Formula: $\text{AlH}_6\text{O}_{12}\text{P}_3$

Molecular Weight: 317.943

Accurate Mass: 317.888755

Percentage Composition: Al 8.49%; H 1.90%; O 60.39%; P 29.23%

General Statement: Trigonal unit cell

Physical Description: Hygroscopic colourless cryst.

References:

Jameson, R.F. *et al.*, *J.C.S.*, 1954, 4013, (*synth*)

D'Yvoire, F.B., *Bull. Soc. Chim. Fr.*, 1961, 2227, (*props*)

Christyakova, A.A. *et al.*, *Izv. Akad. Nauk SSSR, Neorg. Mater.*, 1969, **5**, 536; *Inorg. Mater. (Engl. Transl.)*, 1969, **5**, 449, (*props*)

Morris, J.H. *et al.*, *Chem. Soc. Rev.*, 1977, **6**, 173, (*rev*)

Kniep, R. *et al.*, *Angew. Chem., Int. Ed.*, 1978, **17**, 272, (*synth, cryst struct*)

Kniep, R. *et al.*, *Z. Naturforsch., B*, 1978, **33**, 1047; 1979, **34**, 750; 1980, **35**, 403, (*rel compds*)

Brodalla, D. *et al.*, *Z. Naturforsch., B*, 1981, **36**, 907, (*cryst struct*)

Bobrov, B.S. *et al.*, *Zh. Prikl. Khim. (Leningrad)*, 1983, **56**, 1463; *J. Appl. Chem. USSR (Engl. Transl.)*, 1983, **56**, 1370, (*synth*)

Lyutsko, V.A. *et al.*, *Zh. Neorg. Khim.*, 1989, **34**, 2024; *Russ. J. Inorg. Chem. (Engl. Transl.)*, 1989, **34**, 1152, (*synth, ir*)