>>**Entry Name: Aluminium(*III*) fluoride (AlF_3)**
Synonym(s): Aluminium trifluoride

CAS Registry Number: 7784-18-1

AlF_3

Molecular Formula: AlF_3
Molecular Weight: 83.977
Accurate Mass: 83.976748
Percentage Composition: Al 32.13%; F 67.87%
General Statement: Has LaF_3 struct. in solid state. Mainly monomeric in vapour, with small amounts of dimer
Use/Importance: Constit. of electrolyte in aluminium smelting. Also in ceramics, glass, enamels. With KHF_2 reagent for prepn. of fluorohydrins. Commercially available
Physical Description: Colourless cryst.
Boiling Point: Subl. 1270°
Solubility: Spar. sol. H_2O; insol. org. solvs.
Other Data: ε 4.9; n_D 1.382. $\Delta H^\circ_{f\,298}$ –1510.4 kJ mol^{-1}; S° 66.5 J K^{-1} mol^{-1}

Aldrich: 33291-7
Sigma: A8205

>>**Derivative:** Trihydrate

CAS Registry Number: 15098-87-0
Molecular Formula: $AlF_3H_6O_3$
Molecular Weight: 138.022
Percentage Composition: Al 19.55%; F 41.29%; H 4.38%; O 34.78%
Source/Synthesis: α-Form from HF and Al; β-form from aq. AlF_3 at 100°
Physical Description: Colourless cryst. (H_2O)
Aldrich: 23609-8
Fluka: 6235

>>**Derivative:** Nonahydrate

CAS Registry Number: 15098-89-2
Molecular Formula: $AlF_3H_{18}O_9$
Molecular Weight: 246.114
Percentage Composition: Al 10.96%; F 23.16%; H 7.37%; O 58.51%
Physical Description: Colourless cryst. (H_2O)

>>**Variant:** α-form

Molecular Formula: AlF_3
Molecular Weight: 83.977
Accurate Mass: 83.976748
Percentage Composition: Al 32.13%; F 67.87%
General Statement: Cubic high temp. form converts to rhombohedral form at r.t.
Source/Synthesis: Synth. by heating $[NH_4]_3[AlF_6]$ to 450° in a stream of F_2 for 48 h, or to 700° under Ar for 20 h
Physical Description: Air- and moisture-stable colourless needles

>>**Variant:** β-form

Molecular Formula: AlF_3
Molecular Weight: 83.977
Accurate Mass: 83.976748
Percentage Composition: Al 32.13%; F 67.87%
General Statement: Orthorhombic struct. relat. to tungsten bronze
Source/Synthesis: Synth. by heating α-$[NH_4][AlF_4]$ to 450°, or by heating α-$AlF_2.3H_2O$ to 220°
Other Data: Metastable