



>>Entry Name: Aluminium perchlorate (Al(ClO₄)₃)

Synonym(s): Perchloric acid, aluminium salt, 11Cl

CAS Registry Number: 14452-39-2

Related CAS Registry Numbers(s): 81029-06-3

Al(ClO₄)₃

Molecular Formula: AlCl₃O₁₂

Molecular Weight: 325.332

Accurate Mass: 323.827075

Percentage Composition: Al 8.29%; Cl 32.69%; O 59.01%

Source/Synthesis: Synth. from AlCl₃ and AgClO₄ in C₆H₆

Use/Importance: Commercially available. Aq. solns. source of Hexaaquaaluminium(3+) [JZF19-W](#). Similar species in DMF, dioxan, etc.

Physical Description: White hygroscopic cryst.

Solubility: Sol. H₂O, Et₂O; insol. CCl₄, freons

Other Data: Salts MAI(ClO₄)₄·2H₂O (M = Rb or Cs) also descr. Reacts slowly with paraffin hydrocarbons. Dec. >150°

Hazard & Toxicity: May explode

>>Derivative: 4.5 Hydrate

Physical Description: Colourless hygroscopic cryst.

>>Derivative: Hexahydrate

Synonym(s): Hexaaquaaluminium(3+) triperchlorate

CAS Registry Number: 22993-14-2

Molecular Formula: AlCl₃H₁₂O₁₈

Molecular Weight: 433.424

Accurate Mass: 431.890465

Percentage Composition: Al 6.23%; Cl 24.54%; H 2.79%; O 66.45%

Source/Synthesis: From hydrated alumina and aq. HCl

Physical Description: Colourless cryst. (H₂O)

>>Derivative: Heptahydrate

Source/Synthesis: Synth from AlCl₃·6H₂O and HClO₄ followed by addn. of dioxan

Physical Description: Colourless hygroscopic cryst. + 4 dioxan (H₂O)

Solubility: Sol. H₂O, MeOH, Me₂CO, EtOAc; spar. sol. Et₂O; insol. C₆H₆, CHCl₃, CCl₄

Hazard & Toxicity: May explode when dry

>>Derivative: Cl₂O₆ complex

Molecular Formula: AlCl₅O₁₈

Molecular Weight: 492.234

Accurate Mass: 489.734269

Percentage Composition: Al 5.48%; Cl 36.01%; O 58.51%

Source/Synthesis: Synth. from AlCl₃ and Cl₂O₆

Physical Description: Orange v. hygroscopic solid

Solubility: Sol. SO₂

Hazard & Toxicity: May explode with org. liqs.

References:

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Perrier, M. *et al.*, *Chem. Ber.*, 1962, **95**, 257, (*heptahydrate dioxan complex, synth*)
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Movius, W.G. *et al.*, *J. Phys. Chem.*, 1968, **72**, 3063, (*DMF complexes*)
Lamesheva, D.G. *et al.*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1969, **18**, 1877, (*4.5 hydrate, synth, ir*)
Hinton, J.F. *et al.*, *Spectrochim. Acta A*, 1969, **25**, 119, (*pmr*)
Nikitina, Z.K. *et al.*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1973, **22**, 723; 971, (*Cl₂O₆ complex, synth, props, ir*)
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Reuben, Y. *et al.*, *J. Phys. Chem.*, 1976, **80**, 2394, (*pmr*)