



>>Entry Name: Phosphorus chloride (PCl₅)

Synonym(s): Phosphorus pentachloride. Pentachlorophosphorane, 9Cl. Phosphoric chloride. Tetrachlorophosphorus(1+) chloride

CAS Registry Number: 10026-13-8

PCl₅ (vap.) PCl₄⁽⁺⁾PCl₆⁽⁻⁾ or PCl₄⁽⁺⁾Cl⁽⁻⁾ (solid state)

Molecular Formula: Cl₅P

Molecular Weight: 208.237

Accurate Mass: 205.818022

Percentage Composition: Cl 85.13%; P 14.87%

Use/Importance: Catalyst in org. reactions. Chlorinating agent, e.g. converting many primary and secondary alcohols to alkyl chlorides; amides → chloroimines.

Deoxygenating agent e.g. for nitro compds. Commercially available

Hazard & Toxicity: Corrosive. Attacks eyes and mucous membranes

Aldrich: 15777-5

Fluka: 79590

>>Variant: Molecular-form

Molecular Formula: Cl₅P

Molecular Weight: 208.237

Accurate Mass: 205.818022

Percentage Composition: Cl 85.13%; P 14.87%

polar solvs. in equilibrium with ionic forms

Other Data: Forms a weak complex with C₆H₆. In vap., some dissociation → PCl₃ + Cl₂

>>Variant: Ionic-form

Synonym(s): Tetrachlorophosphonium hexachlorophosphate. Tetrachlorophosphorus(1+) hexachlorophosphate(1-)

CAS Registry Number: 19453-01-1

Molecular Formula: Cl₁₀P₂

Molecular Weight: 416.474

Accurate Mass: 411.636044

Percentage Composition: Cl 85.13%; P 14.87%

polar solvs. e.g. MeCN, MeNO₂, PhNO₂ and also CCl₄

Physical Description: Moisture-sensitive off white or pale yellowish cryst. which fume strongly evolving HCl gas. Pungent odour

Melting Point: Mp 167°

Boiling Point: Subl. 160°

Other Data: At lower concs. (<0.03M) in polar solvs., the struct. reverts to [PCl₄⁽⁺⁾][Cl⁽⁻⁾], which is also the struct. in HCl(l)

References:

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