



>>Entry Name: Phosphorus fluoride (PF₅)

Synonym(s): Pentafluorophosphorane, 9Cl. Phosphorus pentafluoride. Pentafluorophosphorus(*V*)

CAS Registry Number: 7647-19-0

PF₅

Molecular Formula: F₅P

Molecular Weight: 125.966

Accurate Mass: 125.965777

Percentage Composition: F 75.41%; P 24.59%

Source/Synthesis: Various syntheses: PCl₅ + AsF₃, or SbF₃; F₂ + PCl₅ or PCl₃; P₄O₁₀ + CaF₂, or SF₄; PF₃ + F₂; or by action of heat on MPF₆ (M = Na, Ca, Ba)

Use/Importance: Catalyst for polym. reactions

Physical Description: Colourless gas which fumes strongly in air. Thermally stable. Non-electrolyte in HF(l). Interacts weakly with arenes, e.g. naphthalene. V. strong Lewis acid and complexes with NH₃, and amines; those from Et₃N, *i*-PrNH₂ are unstable

Melting Point: Mp −83° (−91.6°)

Boiling Point: Bp −75° (−85°)

Other Data: Δ*H*_f(g) −1593 kJ mol^{−1} (−1210 kJ mol^{−1})

Hazard & Toxicity: Strong irritant. Poisonous

>>Derivative: MeNH₂ complex (1:1)

Molecular Formula: CH₅F₅NP

Molecular Weight: 157.023

Accurate Mass: 157.007976

Percentage Composition: C 7.65%; H 3.21%; F 60.50%; N 8.92%; P 19.73%

Physical Description: Solid

Other Data: Dec. at 60°

>>Derivative: Aniline complex (1:1)

Molecular Formula: C₆H₇F₅NP

Molecular Weight: 219.094

Accurate Mass: 219.023626

Percentage Composition: C 32.89%; H 3.22%; F 43.36%; N 6.39%; P 14.14%

Physical Description: Solid

Melting Point: Mp 175-210 dec.°

References:

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