



>>>**Entry Name: Phosphorus nitride (P₃N₅), 9Cl, 8Cl**

Synonym(s): Triphosphorus pentanitride

CAS Registry Number: 12136-91-3

P₃N₅

Molecular Formula: N₅P₃

Molecular Weight: 162.955

Accurate Mass: 162.936656

Percentage Composition: N 42.98%; P 57.02%

Source/Synthesis: Synth. from Phosphoryl nitride [HTK47-Q](#) + NH₃ at 870°; PH₃ + NH₃ in N₂ at 860-900°; P₄(NH)₆ heated to 850-900° in NH₃

Physical Description: Air-stable white odourless solids

Solubility: Insol. acids, bases and all common solvs.

Other Data: Dec. by heat and light into P + N₂. With H₂O at 180°r H₃PO₄+ NH₃

>>>**Variant:** Amorphous-form

Molecular Formula: N₅P₃

Molecular Weight: 162.955

Accurate Mass: 162.936656

Percentage Composition: N 42.98%; P 57.02%

Source/Synthesis: Synth. from P + N₂, or PH₃ + N₂

>>>**Variant:** α-form

Molecular Formula: N₅P₃

Molecular Weight: 162.955

Accurate Mass: 162.936656

Percentage Composition: N 42.98%; P 57.02%

atoms and the remaining N atoms are bridging 2 P atoms

Source/Synthesis: Obt. from amorphous form + NH₃ at 800-900°, or by thermol. of [P(NH₂)₄]I at 825°

Physical Description: Beige cryst., stable at r.t.

Solubility: Insol. all common solvs.

Other Data: Resistant to hot acids and alkaline solns.

>>>**Variant:** β-form

Molecular Formula: N₅P₃

Molecular Weight: 162.955

Accurate Mass: 162.936656

Percentage Composition: N 42.98%; P 57.02%

Physical Description: Cryst., stable at r.t.

>>>**Variant:** γ-form

Molecular Formula: N₅P₃

Molecular Weight: 162.955

Accurate Mass: 162.936656

Percentage Composition: N 42.98%; P 57.02%

Source/Synthesis: Synth. from α-form in NH₃ at 500° and 40 atm.

>>>**Variant:** δ-form

Molecular Formula: N₅P₃

Molecular Weight: 162.955

Accurate Mass: 162.936656

Percentage Composition: N 42.98%; P 57.02%

2 P atoms; α- and β-P₃N₅ forms distinguished; these are differentiated only by stacking order of identical sheets

Source/Synthesis: Synth. from (PNCl₂)₃ + NH₄Cl at 497-777°

Use/Importance: First report of unique binary struct. type, combining tetrahedral struct. with very rare 3:5 molar ratio of constituent elements

Physical Description: Ai- and moisture-stable, fine crystalline colourless powder

Solubility: Insol. acids, bases, org. solvs.

Other Data: H- and O-free, crystalline and stoichiometric form; thermal degradation begins at T >825°, leading to N₂, PN and P₄