



>>Entry Name: **Diphosphoric acid**, 9CI

Synonym(s): Pyrophosphoric acid. Heptaoxidiphosphoric(*V*,*V*) acid. P⁵-O-P⁵ acid. Tetrahydrogen μ-oxo-hexaoxophosphate. μ-Oxo-hexaoxidiphosphoric acid

CAS Registry Number: 2466-09-3

(HO)₂P(O)OP(O)(OH)₂

Molecular Formula: H₄O₇P₂

Molecular Weight: 177.975

Accurate Mass: 177.943229

Percentage Composition: H 2.27%; O 62.93%; P 34.81%

Source/Synthesis: Synth. from H₃PO₄ + P₄O₁₀, or by heating H₃PO₄ at 100-200°

Use/Importance: Present in normal plasma and other biological fluids, bone and teeth. Abnormality in metabolism leads to hypophosphatasia - an inherited bone disease.

Many organic derivs. are also biologically important being involved in biological phosphorylations

pKa Value: p*K*_{a1} 0.8; p*K*_{a2} 1.8; p*K*_{a3} 6.04; p*K*_{a4} 9 (25°) p*K*_{a3} 5.98; p*K*_{a4} 8.3 p*K*_{a3} 5.76; p*K*_{a4} 8.04

Aldrich: 46613-1

Fluka: 83210

>>Variant: I-form

Molecular Formula: H₄O₇P₂

Molecular Weight: 177.975

Accurate Mass: 177.943229

Percentage Composition: H 2.27%; O 62.93%; P 34.81%

Physical Description: Orthorhombic, colourless cryst. Metastable

Melting Point: Mp 54.3°

Other Data: Converts into form II when heated in sealed tube at 50°

>>Variant: II-form

Molecular Formula: H₄O₇P₂

Molecular Weight: 177.975

Accurate Mass: 177.943229

Percentage Composition: H 2.27%; O 62.93%; P 34.81%

Physical Description: Orthorhombic, colourless cryst

Melting Point: Mp 71.5°

Other Data: Stable at r.t.

>>Derivative: Tetra-NH₄ salt

see Ammonium diphosphate ((NH₄)₄P₂O₇), [HTW32-Q](#)

>>Derivative: Tetra-Li salt

see Lithium diphosphate (Li₄(P₂O₇)), [HTW35-T](#)

>>Derivative: Tetra-Na salt

see Sodium diphosphate (Na₄(P₂O₇)), [HTW34-S](#)

>>Derivative: Tetra-K salt

see Potassium diphosphate (K₄(P₂O₇)), [HTW33-R](#)

References:

Inorg. Synth., 1950, **3**, 96, (*synth, props*)

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Gmelin Handbook Inorg. Chem., Syst. No. 16, 1965, 224

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Russell, R.G.G. *et al.*, *Clin. Orthop. Relat. Res.*, 1975, **108**, 241, (*rev, biol importance*)

Fluck, E. *et al.*, *Pure Appl. Chem.*, 1975, **44**, 373, (*pe*)

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