



>>Entry Name: Sodium diphosphate (Na₄(P₂O₇))

ENTRY UNDER REVIEW

Synonym(s): Tetrasodium pyrophosphate, 8Cl. Tetrasodium diphosphate, 9Cl. Sodium pyrophosphate

CAS Registry Number: 7722-88-5

Na₄(P₂O₇)

Molecular Formula: Na₄O₇P₂

Molecular Weight: 265.902

Accurate Mass: 265.870997

Percentage Composition: Na 34.58%; O 42.12%; P 23.30%

POP 127.5°, P-O(P) 163.1, 164.2, P-O (terminal) 151.3 pm

Source/Synthesis: Obt. by heating Na₂HPO₄ at 700-800° or Na₂HPO₄·12H₂O at 850°

Use/Importance: Used as constituent of heavy-duty detergents, water-softening agents. Complexes with H₂O₂ are used in dental materials, detergents and dispersing agents, esp. for clays

Physical Description: White orthorhombic cryst.

Melting Point: Mp 993° (985°)

Solubility: Sol. cold H₂O (3.2 g per 100 cm³ at 0°; 40 g per 100 cm³ at 100°)

Other Data: Forms 1:1, 1:2, and 1:3 complexes with H₂O₂. Exists in polymorphic forms with transition temps. 400°, 510°, 545° and 560°. ΔH_f° -3183 kJ mol⁻¹

Aldrich: 32246-6

Fluka: 71920

Sigma: P8010

>>Derivative: Decahydrate

CAS Registry Number: 13472-36-1

Molecular Formula: H₂₀Na₄O₁₇P₂

Molecular Weight: 446.055

Accurate Mass: 445.976647

Percentage Composition: H 4.52%; Na 20.62%; O 60.98%; P 13.89%

Source/Synthesis: Obt. by cryst. of satd. aq. soln.

Use/Importance: Heat storage material, often used in conjunction with NaOAc·3H₂O

Physical Description: Colourless efflorescent cryst.

Melting Point: Mp 79.5°

Solubility: V. sol. H₂O (5.4 g per 100 cm³ at 0°; 93 g per 100 cm³ at 100°); insol. EtOH

Other Data: Monoclinic. Molecular dimensions: POP 130.2°, P-O(P)_{av} 161.2, P-O_{av} 152.3 (terminal) pm. ΔH_f° -6143 kJ mol⁻¹. Water of cryst. may be replaced by H₂O₂.

Lose H₂O at 93.8°

Aldrich: 22136-8

Fluka: 71514

Sigma: P9146

>>Derivative: H₂O₂ complex (1:2)

Synonym(s): Sodium pyrophosphate peroxohydrate. Tetrasodium pyrophosphate perhydrate. Diphosphoric acid tetrasodium salt compd. with H₂O₂ (1:2), 12Cl.

Pyrophosphoric acid tetrasodium salt compd. with H₂O₂ (1:2), 8Cl

CAS Registry Number: 15039-07-3

Molecular Formula: H₄Na₄O₉P₂

Molecular Weight: 301.933

Accurate Mass: 301.892127

Percentage Composition: H 1.34%; Na 30.46%; O 47.69%; P 20.52%

Source/Synthesis: Synth. by reacting anhyd. Na₄P₂O₇ with aq. 25-30% H₂O₂

Use/Importance: Commercialised as a textile bleach in the 1960's, but discontinued

Physical Description: Colourless cryst.

References: