

Inorganic Phosphorus Compounds



Inorganic phosphorus is essential for every known form of life. Phosphorus forms many compounds such as metal phosphates, phosphides, oxides, halides, and oxyacids. As phosphates, they play a major role in biological molecules. The phosphorus containing compounds are mainly used as fertilizers. Phosphoric acid is the main source of phosphates used in detergents and other non-fertilizer applications. Calcium phosphate salts help to harden bones. Phosphorus oxoacids (hypophosphorous acid, phosphorous acid and phosphoric acid) are commercially important acids. Phosphoric acid is used to prepare buffer solutions and also used as a catalyst in various reactions.



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Inorganic Fluorophosphates



Inorganic fluorophosphates (PO_3F^{2-}) contain the phosphate anion in which one hydroxyl is replaced with a fluorine atom. The structure of the fluorophosphate anion consists of phosphorus at the center of a tetrahedron defined by three oxygen atoms and one fluorine atom. In Fluoroapatite, OH-groups provided by calcium hydroxide are partly replaced by fluoride ions. Fluoroapatite is barely soluble while calcium fluorophosphate dissolves easily.



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11529 Lithium hexafluorophosphate, 98%



13151 Nitronium hexafluorophosphate



13149 Nitrosonium hexafluorophosphate, 96%



11531 Potassium hexafluorophosphate, 95% min



B20898 Sodium hexafluorophosphate, 98%



39627 Thallium(I) hexafluorophosphate(V), 97% min

Phosphides



A phosphide is a chemical compound of phosphorus with a less electronegative element or elements (metals). The phosphides ion is P^{3-} , and phosphides of almost every metal in the periodic table are known. Binary compounds are formed with the majority of less electronegative elements with the exception of Hg, Pb, Sb, Bi, Te, Po. Phosphides that are rich in metal have high melting points and are hard, brittle, and chemically inert; these compounds have high thermal and electrical conductivities. The structure of the metal-rich phosphides is based on trigonal prisms, which are similar to those in sulfides, but phosphides do not take on layered structures and are metal conductors, not insulators or semiconductors.

Transition metal phosphides are refractory metallic compounds formed from the alloying of metals and phosphorus. Metal phosphides (e.g. nickel phosphide - Ni_2P) are reported to be good catalysts in hydrotreating reaction. Transition metal phosphides have recently been shown to have excellent activity for hydrodesulfurization (HDS) and hydrodenitrogenation (HDN). Among the various types of interstitial compounds, metal phosphides have definitely emerged as important one because of their unexpected properties in catalysis, magnetic applications, and applications in telecommunications, electronic and optoelectronic devices, lithium batteries, and solar cells.



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87219 Cadmium phosphide, 99.5% (metals basis)



47333 Cobalt phosphide, 99.9%



12266 Gallium phosphide, 99.999% (metals basis)



13974 Indium(III) phosphide, 99.9999% (metals basis)



36283 Indium(III) phosphide, 99.999% (metals basis)



43486 Iron phosphide, 99.5% (metals basis)



14020 Manganese phosphide, 99% (metals basis)



47393 Molybdenum phosphide, 99.5%



47364 Tantalum phosphide, 99.5%



45459 Zinc phosphide, 99.999% (metals basis)

Inorganic & Metal Complex Fluorophosphates












Metal complex fluorophosphates are attractive as catalysts in a wide range of applications. Hexafluorophosphate, being a large anion helps to stabilize large cations. Tetrakis(acetonitrile)copper (I) hexafluorophosphate is a coordination compound with the formula $[\text{Cu}(\text{CH}_3\text{CN})_4]\text{PF}_6$ and is used in the synthesis of copper complexes. This compound may serve as a precursor in the non-aqueous syntheses of other Cu(I) compounds. Water-immiscible organic nitriles have been shown to selectively extract Cu^{2+} from aqueous chloride solutions. Through this method, copper can be separated from a mixture of other metals. Hexafluorophosphate is commonly used as a counter-anion for positively charged anion-receptor molecules, being a poor H-bond acceptor. Electrochemiluminescent moieties are useful in the field of medical diagnostics, environmental analysis, and food safety monitoring. The most efficient electrochemiluminescence reaction to date is based on the tris(2,2'-bipyridyl)ruthenium(II) ($\text{Ru}(\text{bpy})_3^{2+}$) hexafluorophosphate complex (Zhou, X.; Zhu, D.; Liao, Y.; Liu, H.; Liu, H.; Ma, Z.; Xing, D. *Nature Protocols*, **2014**, *9*, 1146–1159).










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	L19762	1-Ethyl-3-methylimidazolium hexafluorophosphate, 98+%
	B25251	1H-Benzotriazol-1-yloxytri(1-pyrrolidiny)phosponium hexafluorophosphate, 98%
	A16140	1H-Benzotriazol-1-yloxytris(dimethylamino)phosponium hexafluorophosphate, 98%
	L19086	1-n-Butyl-3-methylimidazolium hexafluorophosphate, 98+%
	H27355	1-n-Butyl-4-methylpyridinium hexafluorophosphate, 99%
	11495	Ammonium hexafluorophosphate, 99.5%
	A17934	Diphenyliodonium hexafluorophosphate, 98%
	11529	Lithium hexafluorophosphate, 98%
	13151	Nitronium hexafluorophosphate
	13149	Nitrosonium hexafluorophosphate, 96%
	H26402	O-(6-Chloro-1H-benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate, 98+%
	H26082	O-(7-Aza-1H-benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate, 99%
	11531	Potassium hexafluorophosphate, 95% min
	A12080	Potassium hexafluorophosphate, 98%

	40030	Potassium hexafluorophosphate, 99% min
	11873	Silver hexafluorophosphate, 98%
	B20898	Sodium hexafluorophosphate, 98%
	13064	Sodium hexafluorophosphate, 99+%
	A17467	Tetramethylammonium hexafluorophosphate, 99%
	A17196	Tetra-n-butylammonium hexafluorophosphate, 98%
	39627	Thallium(I) hexafluorophosphate(V), 97% min

Inorganic Phosphates

















An inorganic phosphate (PO_4^{3-}) is a salt of phosphoric acid with metal ions. It consists of one central phosphorus atom surrounded by four oxygen atoms in a tetrahedral arrangement. Inorganic phosphates occur naturally in many forms and are usually combined with other elements (e.g., metals such as sodium, potassium, calcium and aluminum). Inorganic phosphates are present in all living organisms and are required to support life. Inorganic phosphate in aqueous solution exists primarily as H_2PO_4^- or HPO_4^{2-} , and is an effective buffer.






































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	11827	12-Tungstophosphate hydrate, Reagent Grade
	42858	Aluminum dihydrogen phosphate, 50% w/w aq. soln.
	30715	Aluminum metaphosphate, Al_2O_3 19.4%, P_2O_5 78.9%
	11109	Aluminum phosphate, 97%
	10628	Aluminum phosphate, Puratronic®, 99.99% (metals basis)
	B22934	Ammonium cobalt(II) phosphate, anhydrous, 98%
	B24393	Ammonium cobalt(II) phosphate monohydrate, 98%
	A15283	Ammonium dihydrogen phosphate, 98%
	10633	Ammonium dihydrogen phosphate, Puratronic®, 99.995% (metals basis)
	11495	Ammonium hexafluorophosphate, 99.5%
	A17416	Ammonium hydrogen phosphate, 98%
	10301	Ammonium hydrogen phosphate, tech., P_2O_5 53% min
	A17497	Ammonium magnesium phosphate hexahydrate, 98%
	44053	Ammonium magnesium phosphate hydrate, 99.999% (metals basis)

	17984	Ammonium phosphomolybdate hydrate, Reagent Grade
	15111	Barium hydrogen phosphate
	22641	Barium metaphosphate, 90+%
	39380	Bismuth(III) phosphate, 99%
	32562	Boron phosphate
	40201	Cadmium phosphate (ortho), 99%
	A12123	Calcium dihydrogen phosphate hydrate, 97%
	40232	Calcium hydrogen phosphate, anhydrous, 98% min
	40233	Calcium hydrogen phosphate dihydrate, 98% min
	56168	Calcium hypophosphite
	89836	Calcium phosphate (pyro), 96% min
	36731	Calcium phosphate tribasic, 34-40% Ca
	39215	Cerium(III) phosphate, 99% min
	24110	Chromium(III) phosphate tetrahydrate
	B22066	Cobalt(II) phosphate, anhydrous, 98%
	23111	Cobalt(II) phosphate octahydrate
	A17360	Copper(II) phosphate, 98%
	43760	Copper(II) pyrophosphate hydrate, P_2O_7 43.5-48.5%

	18869	Diiodobis(triphenylphosphine)nickel(II)
	41993	Erbium(III) phosphate hydrate, 99.9% (REO)
	41989	Europium(III) phosphate hydrate, 99.9% (REO)
	41994	Holmium(III) phosphate hydrate, 99.9% (REO)
	A18281	Indium(III) phosphate, 98%
	A15509	Indium(III) phosphide, polycrystalline lump, 99.99% (metals basis)
	41652	Iron(III) hypophosphite
	31106	Iron(III) phosphate hydrate
	43125	Lanthanum(III) phosphate hydrate
	41990	Lanthanum(III) phosphate hydrate, 99.99% (REO)
	A16987	Lithium dihydrogen phosphate, 97%
	10743	Lithium phosphate, Puratronic®, 99.99% (metals basis)
	A14279	Magnesium hydrogen phosphate trihydrate, 97+%
	18219	Magnesium phosphate pentahydrate, P ₂ O ₅ 33%
	39317	Magnesium pyrophosphate
	A17868	Manganese(III) phosphate hydrate, 99%
	47345	Nickel(II) phosphate hydrate, 98+%

	10840	Potassium dihydrogen phosphate, Puratronic®, 99.999% (metals basis), Si 10ppm max
	A12080	Potassium hexafluorophosphate, 98%
	40030	Potassium hexafluorophosphate, 99% min
	A11321	Potassium hydrogen phosphate, dried, 98+%
	33365	Potassium hydrogen phosphate trihydrate, Reagent Grade
	L15168	Potassium phosphate, 97%
	46644	Potassium phosphate, ACS, 98.0% min
	41587	Potassium phosphate, anhydrous, 97%
	41586	Potassium phosphate monohydrate, 95%
	13436	Potassium pyrophosphate, 95%
	44269	Potassium pyrophosphate, anhydrous, 96% min
	41992	Samarium(III) phosphate hydrate, 99.9% (REO)
	40320	Sodium ammonium hydrogen phosphate tetrahydrate, Reagent Grade
	40145	Sodium dihydrogen phosphate, 96%
	A11316	Sodium dihydrogen phosphate dihydrate, 98+%
	10870	Sodium dihydrogen phosphate monohydrate, Puratronic®, 99.998% (metals basis)
	A11551	Sodium dodecamolybdophosphate hydrate, 90+%
	A11575	Sodium dodecatungstophosphate hydrate

	14129	Sodium fluorophosphate
	13064	Sodium hexafluorophosphate, 99+%
	14706	Sodium hexametaphosphate, tech.
	A11817	Sodium hydrogen phosphate, 98+%
	14104	Sodium hypophosphite monohydrate
	A13385	Sodium hypophosphite monohydrate, 97+%, water ca 12-17%
	11590	Sodium phosphate dodecahydrate, ACS, 98.0-102.0%
	13438	Sodium phosphate, tribasic, anhydrous, tech.
	A17546	Sodium pyrophosphate, 98%
	13439	Sodium pyrophosphate, anhydrous, tech.
	A16195	Sodium pyrophosphate decahydrate, 97+%
	33385	Sodium pyrophosphate decahydrate, ACS, 99.0-103.0%
	56146	Sodium thiophosphate hydrate
	89063	Sodium trimetaphosphate
	13440	Sodium tripolyphosphate
	47353	Strontium hydrogen phosphate, HPO_4 51-53%
	39608	Tin(II) fluorophosphate
	89785	Tin(II) pyrophosphate



A17938 Triethyl phosphate, 98+%



41991 Yttrium(III) phosphate hydrate, 99.99% (REO)



11589 Zinc phosphate hydrate, tech.



13013 Zinc phosphate (ortho), Puratronic®, 99.995% (metals basis)



35664 Zinc phosphide, 99.9% (metals basis)

Inorganic Phosphorus Acids



Phosphorus acids are the oxoacids of phosphorus, with varying oxidation states of phosphorus from +1 to +5. Phosphorous acid or phosphonic acid (H_3PO_3) is a dibasic acid with phosphorus in +3 oxidation state. Hypophosphorous acid or phosphinic acid (H_3PO_2) is a monobasic acid having +1 oxidation state for phosphorus. Phosphorus is in +5 oxidation state in phosphoric acid, (H_3PO_4) which is a tribasic acid. Pyrophosphoric acid is a tetraprotic acid with formula $\text{H}_4\text{P}_2\text{O}_7$. Hypophosphoric acid, a tetraprotic acid, $\text{H}_4\text{P}_2\text{O}_6$ contains phosphorus in +4 oxidation state. Phosphorus oxyacids also exist in mixed oxidation states. Peroxomonophosphoric acid, H_3PO_5 , is a tribasic acid with a peroxide group.



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33266 Phosphoric acid, 85% w/w aq. soln., ACS



89407 Phosphorous acid, 97%



A11189 Phosphorous acid, 98+%

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