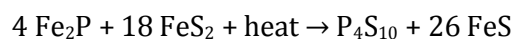
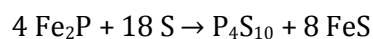


Phosphorus Pentasulfide

Phosphorus pentasulfide is the inorganic compound with the formula P_4S_{10} . This yellow solid is the one of two phosphorus sulfides of commercial value. Samples often appear greenish-gray due to impurities.

Its tetrahedral molecular structure is related to that of adamantane and is almost identical to the structure of phosphorus pentoxide.

Phosphorus pentasulfide is obtained by the reaction of liquid white phosphorus (P_4) with sulfur above $300\text{ }^\circ\text{C}$. The first synthesis of P_4S_{10} by Berzelius in 1843 was by this method. Alternatively, P_4S_{10} can be formed by reacting elemental sulfur or pyrite, FeS_2 , with ferrophosphorus, impure Fe_2P (a byproduct of P_4 production from phosphate rock):



Specification: Phosphorus Pentasulfide

Items \ Spec		Industrial Grade
P	%	27.3-28.3
S	%	71.0-72.5
Fusing Point	$^\circ\text{C} \geq$	274
Fusing Distance,	$^\circ\text{C}$	3
Resides on Ignition	$\% \leq$	0.40
Fe	$\% \leq$	0.01
Gain rate of diethylthiophosphoric Acid,	$\% \geq$	85
Standard Gain rate of diisobutyldithiophosphoric Acid,	$\% \geq$	85
Granularity or sheet thickness, Powders: residues of though 850um mesh,	$\% \leq$	2

Identifiers

SKU: D9033

CAS number: 1314-80-3

HS Code: 2813.9000.10

Properties

Molecular formula: P_4S_{10}

Molar Mass:
444.555g/mol

Density: 2.09g/cm^3

Melting Point: $288\text{ }^\circ\text{C}$

Boiling Point: $514\text{ }^\circ\text{C}$

Appearance: yellow solid

Solubility in Water:

Hydrolyses

Solubility in other solvents

$0.222\text{ g} / 100\text{g CS}_2$ (at $17\text{ }^\circ\text{C}$)

Insoluble in C_6H_6

Insoluble in hot xylene

Insoluble in hot anisole.

sheet thickness of borneol flakes, mm	≤	0.5	
Protection	<p>Avoid contact with skin and eyes. Avoid formation of dust and aerosols.</p> <p>Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.</p>		
Packing and Storage	<p>In steel drum of net weight of 50 kg, 100kg, 200kg.</p> <p>Keep container tightly closed in a dry and well-ventilated place.</p> <p>Never allow product to get in contact with water during storage. Keep in a dry place</p>		
Applications	<p>Approximately 150,000 tons of P₄S₁₀ are produced annually. The compound is mainly converted to other derivatives for use as lubrication additives such zinc dithiophosphates. It is also used in the production of pesticides such as Parathion and Malathion. It is also a component of some amorphous solid electrolytes (e.g. Li₂S-P₂S₅) for some types of lithium batteries.</p> <p>Phosphorus pentasulfide is a dual-use material, for the production of early insecticides such as Amiton and also for the manufacture of the related VX nerve agents.</p> <p>Due to hydrolysis by atmospheric moisture, P₄S₁₀ evolves H₂S, thus P₄S₁₀ is associated with a rotten egg odour. Aside from H₂S, hydrolysis of P₄S₁₀ gives phosphoric acid:</p> $P_4S_{10} + 16 H_2O \rightarrow 4 H_3PO_4 + 10 H_2S$ <p>Other mild nucleophiles react with P₄S₁₀, including alcohols and amines. Aromatic compounds such as anisole, ferrocene and 1-methoxynaphthalene react to form 1,3,2,4-dithiadiphosphetane 2,4-disulfides such as Lawesson's reagent.</p> <p>In organic chemistry P₄S₁₀ is used as a thionation reagent. Reactions of this type require refluxing solvents such as benzene, dioxane or acetonitrile with P₄S₁₀ dissociating into P₂S₅. P₂S₅ can be trapped for example as the pyridine complex. Ketones are converted to thioketones.</p> <p>In esters, imides and lactones the oxygen atom can also be replaced by sulfur. With amides the reaction product is a thioamide. With 1,4-diketones the reagent forms a thiophene. Compared to the better known Lawesson's reagent P₄S₁₀ suffers from reduced yields.</p>		

*Data from Wikipedia