

Phosphorous

Allotropes of phosphorous:

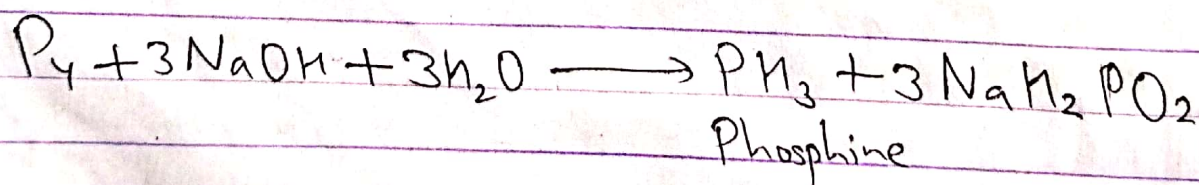
The phenomena of existence of elements in more than one form which are physically different but chemically identical is known as allotropy. The elements exhibiting this property is said to be allotropic and these different physical states are called allotropic form or allotropic modification or simply allotropes.

Phosphorous exists as following allotropes.

- (a) White or yellow phosphorous
- (b) Red Phosphorous
- (c) Black Phosphorous
- (d) Scarlet Phosphorous
- (e) Violet Phosphorous

Preparation of Phosphine:

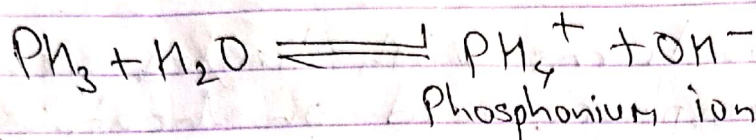
In the laboratory, Phosphine is prepared by heating white phosphorous with concentrated solution of alkalis in an inert atmosphere of carbon dioxide.



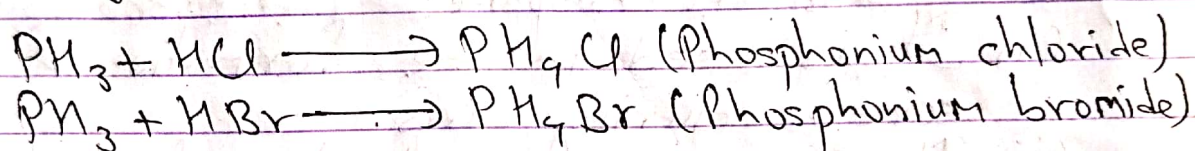
Properties of Phosphine:

1. Basic nature:

Phosphine is weak base. In aqueous solution, it ionizes partially to give hydroxide ion.

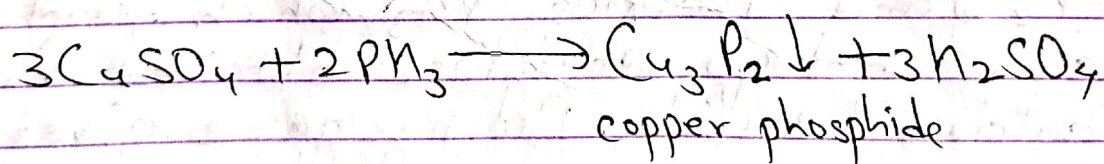


Since phosphine is basic in nature, it reacts with halogen acid to form phosphonium salt.



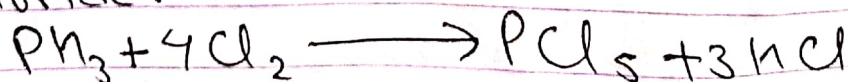
2. Reducing property:

Phosphine reduces solution of heavy metal like Cu^{++} , Ag^+ , Au^{+++} , Hg^{++} , etc into corresponding ppt. of metal phosphide.

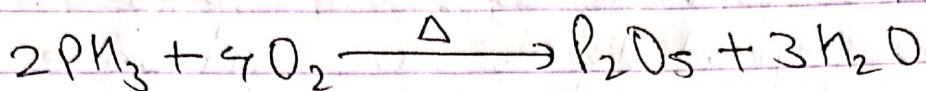


3. Action with halogen:

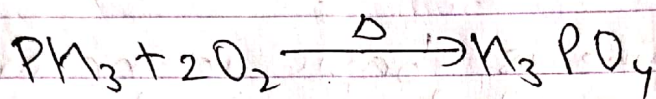
Phosphine burns with chlorine to give phosphorous pentachloride.



4. Action with oxygen: excess of phosphine burns with oxygen to form phosphorous pentoxide on heating.



Phosphine burns with limited oxygen to form phosphoric acid on heating.



Uses of Phosphine:

- (i) It is used in the formation of smoke screen during wars.
- (ii) It is used in production of Holme's signals. Mixture of calcium carbide and calcium phosphide is taken in a container which is pierced and thrown into sea out of the submarine. Calcium phosphide reacts with H_2O and liberates PH_3 which catches fire and light up acetylene obtained from calcium carbide. Burning gases gives a signal in a sea-journey during emergency, called Holme's signal.