

## Assignment-4

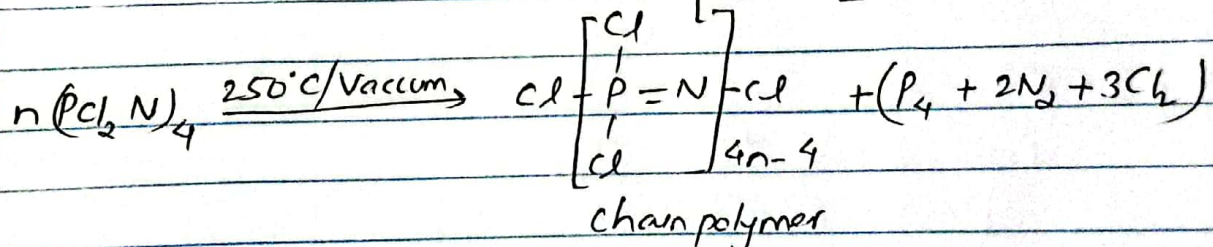
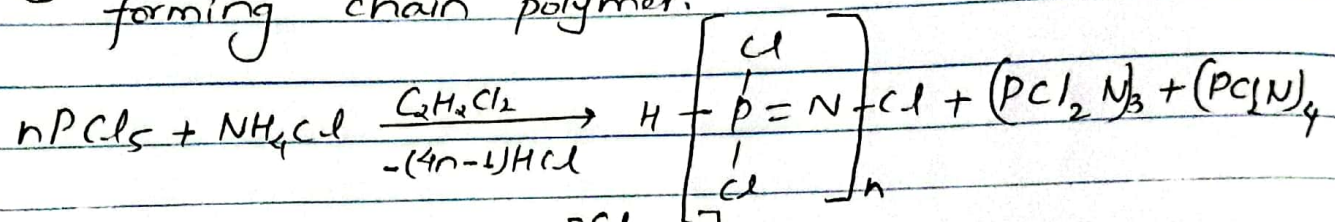
Kabin Gini  
BCF-A  
Roll-044

### Inorganic polymers:

1. Explain the preparation and uses of polyphosphazines, and polymeric sulfur nitride.

#### → a) Polyphosphonitrile chlorides

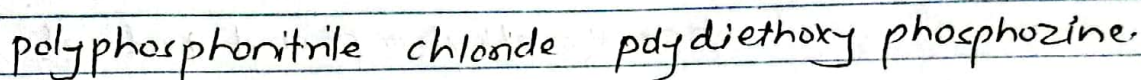
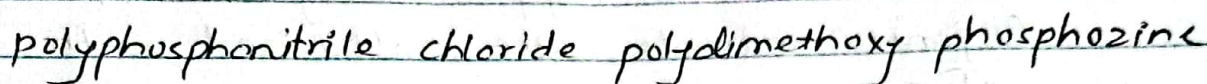
They are prepared by reaction between phosphorus pentachloride and ammonium chloride in presence of  $C_6H_5Cl$  at  $120-150^\circ C$  followed by heating cyclic tetramer in vacuum at  $250^\circ C$  forming chain polymer.



#### b) Polydimethoxy phosphazines and polydiethoxy phosphazines

They are prepared by the reacting of phosphonitrile chloride with sodium methoxide ( $CH_3ONa$ ) and sodium ethoxide ( $C_2H_5ONa$ ) respectively.

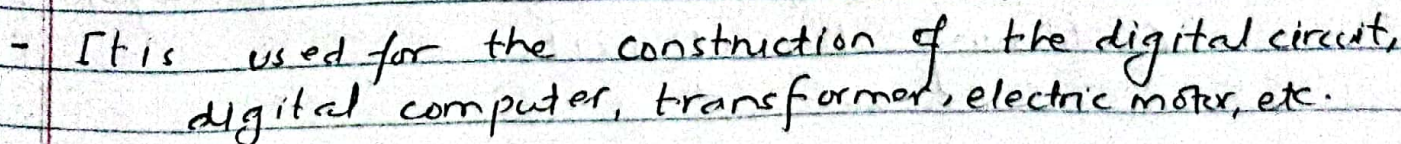




1) They are used for making transparent and film forming thermopolymers.

ii) They are used for preparation of thermopolymers.

It is nearly planner chain of S-N bonds of approximately identical length nearly 16nm.

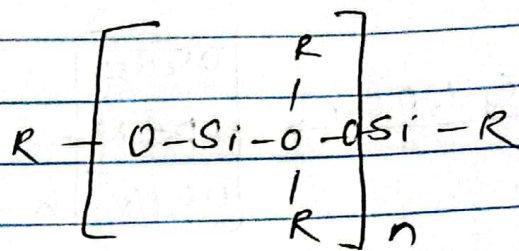




2. Write short notes:-

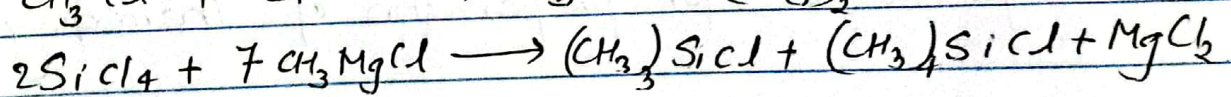
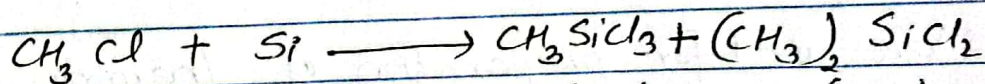
a) Silicones

It is an organic polymer which contains alternate silicon, oxygen linkage, ~~oxygen~~. Organic radicals are attached with silicon atom.



where, R = alkyl or phenyl radical.

They are prepared by the action of silicon with alkyl halide or silicon halide with Grignard reagent.

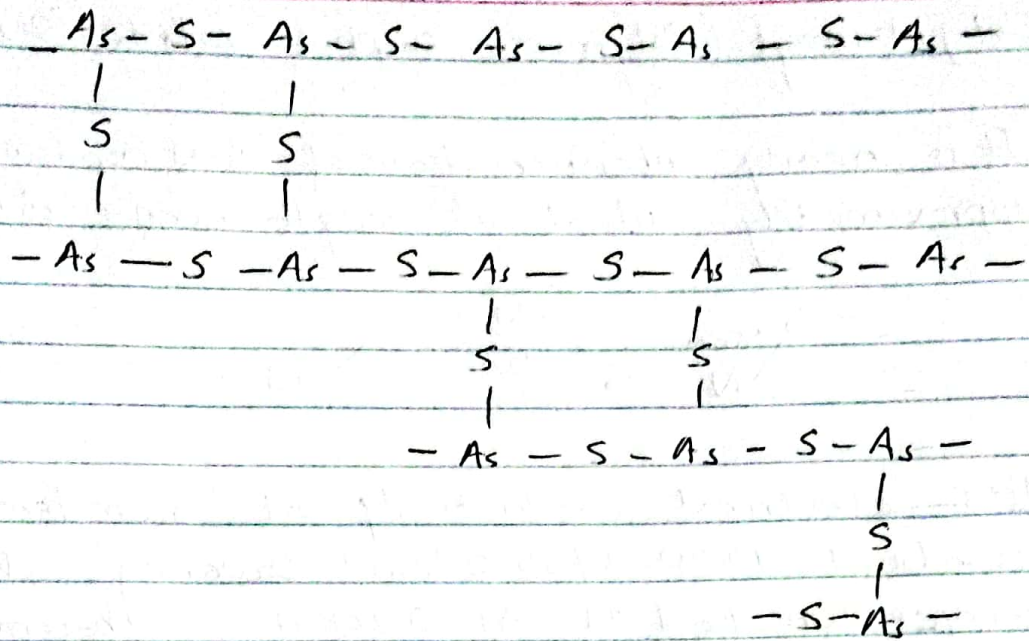


b) Chalcogenide glasses

They are cross-linked amorphous polymers prepared by the quenching of chalcogenite compounds with one or more of the polyvalent elements like As, Ge, In, P etc.

It is a compound containing elements like S, Se, Te etc.  $\text{As}_2\text{S}_3$  is the best known chalcogenite containing two elements.



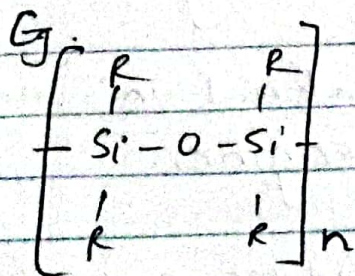


Uses :-

- i) Memory device for computers.
- ii) Electroluminescent displays
- iii) Ultrasonic delay lines.

3) What are inorganic polymers? Give an account of chalcogenides glass and polythiazyl.

→ Inorganic polymers are 'macromolecules' formed by the combination of atoms other than carbon in main chain or back bone. Elements like Si, P, N, S etc.



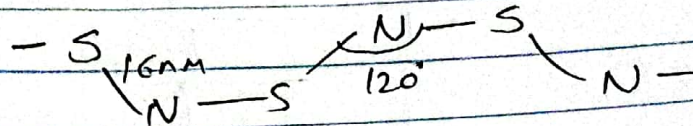
Silicone

$(\text{SN})_n$ , etc  
Polysulphur nitride.



Polythiazyl (Polymeric sulphur nitride)  $(SN)_n$

It is nearly planar chain of S-N bonds of approximately identical length nearly 16 nm.



Its electrical conductivity at room temperature is about  $1200-3700 \Omega^{-1}cm^{-1}$  lowering the temperature to 4.2 K. At 0.26 K it becomes a Super conductor. This polymer is the first non-metallic super conductor.

4) What do you mean by inorganic polymers? Mention the applications of silicones in engineering field.

→ Inorganic polymers are macromolecule formed by the combination of atoms other than carbon in main chain or back bone. Elements like Si, P, N, S, etc.

Application of silicones in engineering field:-

i) They are used as sealing material in search lights and in aircraft engines.

ii) For manufacture of tyres for fighter aircrafts.

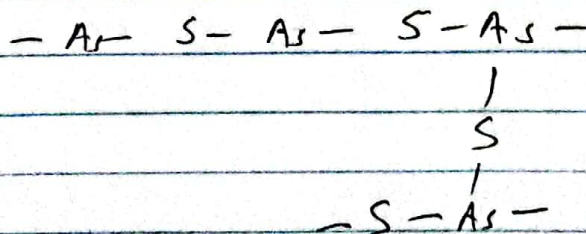
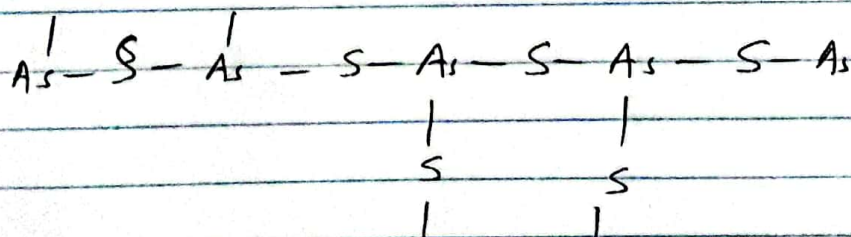
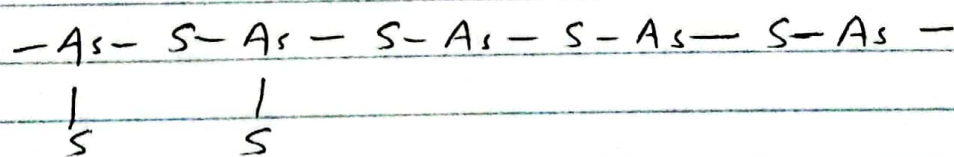


iii) As adhesive in electronic industry

iv) For making artificial heart valves transfusion tubing and padding for plastic surgery.

5) What are chalcogenide glasses? Give an account of preparation and uses of network polymers of sulfur.

→ Chalcogenide glasses are cross-linked amorphous polymers prepared by the quenching of chalcogenite compounds with one or more of the polyvalent elements like As, Ge, In, P.



Uses:-

i) Memory device for computers

ii) Ultrasonic delay lines

iii) High energy particle detector multipliers.

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