Solid State - NCERT Points

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1. Liquids and gases are called fluids because of their ability to flow.
2. The constituent particles in solids have fixed positions and can oscillate about their mean positions. This explains the rigidity in solids.
3. Carbon nanotubes are new materials that have potential to provide materials that are tougher than steel, lighter than aluminium and have more conductive property than Copper.
4. Intermolecular forces tend to keep the molecules/atoms/ions closer and thermal energy tends to keep them apart by making them move faster.
5. Properties of solids -
   (i) intermolecular distances are short
   (ii) intermolecular forces are strong
   (iii) incompressible and rigid.
6. Quartz = crystalline Quartz glass = amorphous.
7. Amorphous solids have the same structural features as liquids and are conveniently regarded as extremely viscous liquids.
8. Crystalline solids are anisotropic, that is, some of their physical properties like electrical resistance or refractive index show different values when measured along different directions in the same crystal.
9. There are some solids which apparently appear amorphous but have microcrystalline structures. These are called polycrystalline solids. Metals often occur in polycrystalline condition. So a metallic sample may appear to be isotropic even though a single crystal is anisotropic.

10. Amorphous silicon is one of the best photovoltaic material available for the conversion of sunlight into electricity.

11. In a crystal, the structural unit is called motif / basis which is a molecule / ion / atom.

12. For non-ionic solids - (electrical neutrality not maintained)

(i) Vacancy defect
- some lattice sites are vacant
- density ↓es.

(ii) Interstitial defect.
- some constituent particles occupy an interstitial site.
- density ↑es.

13. For ionic solids -
(i) Frenkel defect (ii) Schottky defect.

14. No. of schottky defects in ionic solids is quite significant. In NaCl, there are 10^6 Schottky pairs per cm^3 at room temp. In $1\ cm^3$ there are 10^{22} ions. Thus, there is 1 schottky defect per 10^{16} ions.

15. The cationic vacancies produced are equal in number to the impurity ions added in impurity defect.

16. In metal excess defect, the colour results by excitation of the e^-s when they absorb energy from the visible light falling on the crystals.
LiCl = pink NaCl = yellow KCl = violet / lilac.

17. Due to metal excess defect due to excess cations, formula = $Zn_{1+x}O$.

1. $K_2[HgI_4]$ — Nessler's Reagent

2. $[Ni(dmg)_2]$ — Rosy red ppt. (test for Ni^{+2})

3. $Na_2[Fe(CN)_5NO]$ — Sodium nitro prusside
   NO = +1 Fe = +2

4. $[Fe(H_2O)_5NO]SO_4$ — NO = +1 Brown ring complex
   exceptionally - Fe = +1

5. $Fe^{+3}_4[Fe^{+2}(CN)_6]_3$ — Ferri ferro cyanide - Prussian blue
   or

6. $Fe^{+2}_3[Fe^{+3}(CN)_6]_2$ — Ferro ferri cyanide - Turn bulls blue
   or.

7. $Cu^{+2}_2[Fe^{+2}(CN)_6]$ — Copper ferro cyanide - Chocolaty brown
   used to make semi-permeable membrane (SPM)

8. $[Rh(PPh_3)_3Cl]$ — Wilkinson's catalyst ⇒ used for hydrogenation of olefines.

9. $[Fe(C_5H_5)_2]$ — Ferrocene [Bis-(Cyclopenta dienyl) iron (II)]
   denticity = 3.