

CLASS 12

CHEMISTRY

REVISION NOTES

Revision Notes: Class 12 Chemistry Chapter 1 The Solid State

Note: Not part of the current CBSE board-exam syllabus (excluded since 2023-24 rationalisation), but important for JEE/NEET.

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Crystalline solids: long-range order, sharp melting point, anisotropic. **Amorphous solids:** only short-range order, gradual softening, isotropic ('pseudo-solids')

Types of crystals: molecular (weak forces), ionic (electrostatic), metallic (delocalised electrons), covalent/network (strong covalent bonds, e.g. diamond, SiC)

Coordination number: simple cubic=6, bcc=8, hcp/ccp(fcc)=12

Packing efficiency: simple cubic=52.4%, bcc=68%, hcp/ccp=74%

Density formula: $d = \frac{ZM}{a^3 N_A}$ — Z=atoms/cell, M=molar mass, a=edge length, N_A =Avogadro number

Voids: tetrahedral ($r/R \approx 0.225$), octahedral ($r/R \approx 0.414$); in close packing, tetrahedral voids = $2 \times$ number of spheres, octahedral voids = number of spheres

Point defects: Schottky (paired vacancies, lowers density, e.g. NaCl), Frenkel (ion displaced to interstitial site, density unchanged, e.g. AgBr), interstitial (extra particles, raises density), F-centres (electron trapped in anion vacancy, causes colour)

Electrical properties: conductors (partly-filled/overlapping bands), insulators (large band gap), semiconductors (small band gap, conductivity rises with temperature); n-type (group 15 doping), p-type (group 13 doping)

Magnetic properties: ferromagnetic (Fe, Co, Ni — strong, permanent), paramagnetic (weak, temporary), ferrimagnetic (unequal opposing alignment), antiferromagnetic (equal opposing alignment, net zero)