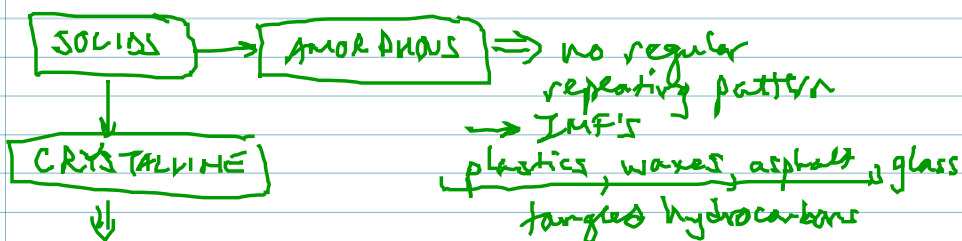


SOLIDS Key idea → nature of attractive force

generalise → closest "packing" of particles of all 3 states
→ high density, rigid, incompressible
→ the stronger the attractive force the higher the mp



3-D repeating pattern

↳ crystal lattice

lattice points ⇒ ions, molecules, atoms

4 types

- ① MOLECULAR
- ② IONIC
- ③ METALLIC
- ④ COVALENT (NETWORK)

MOLECULAR SOLIDS

→ molecules at lattice points

→ molecules held together by IMF's

STRONG forces WITHIN the molecules

~ WEAK forces between them

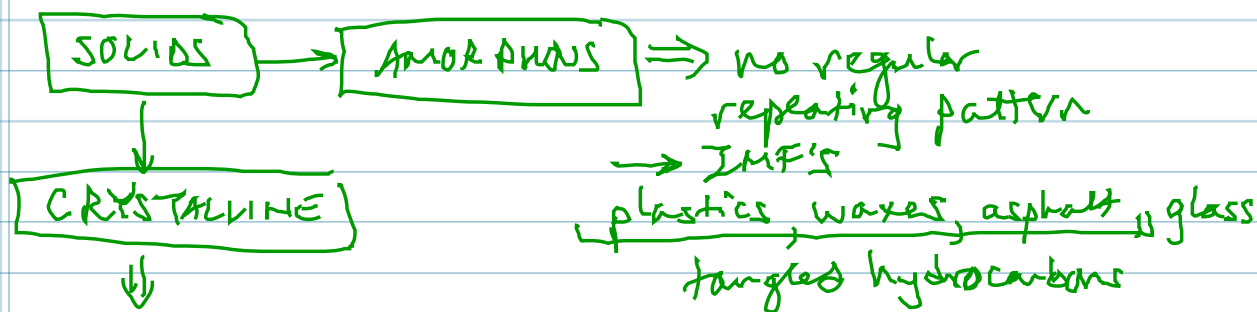
- low mp, soft, crumbly

ice, iodine (I_2), sulfur (S_8), phosphorus (P_4)

dry ice CO_2

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(2) IONIC SOLIDS

→ ions at lattice points

→ held together by ionic bonds $F = \frac{kQ_1Q_2}{r^2}$

- ROCKS

- high mp, brittle

- nonconducting solids

but → conduct as liquids or aqueous soln
electrolytes

(3) METALLIC SOLIDS

→ metal atoms (ions) at lattice points

- shiny

- malleable, ductile, high mp

- conductors

- METALLIC BONDING

- strong, nondirectional

"SEA of ELECTRONS"

→ delocalized valence e⁻
surrounding (+) ion cores

Why are metals good conductors?

BAND THEORY

- when atoms come together and bond,
AO's combine to form Molecular Orbitals (MO)

- MO's will have different E's based on
which/how many AO's were combined

"band" of allowable E's

valence band \Rightarrow e^- 's involved in bonding

conduction band \Rightarrow e^- 's @ $\uparrow E$ than
valence band but
NOT LOST

band gap is very small in metals