

## QUIZ

$\begin{Bmatrix} M \\ F \end{Bmatrix}$  MAS 345 // W : MAS 212

## BONDING IN SOLIDS

4 kinds of (crystalline) solids.

1. Ionic solids
2. Molecular Crystals.
3. Network Covalent Solids
4. Metallic.

### ① Cation/Anion

+/- attraction holds everything together.

STRONG  
- POOR CONDUCTORS of heat + electricity.  
- HARD

- BRITTLE  
HIGH MP/BP



### ② Molecular crystal.

- Molecules held together by (usually weak) IMF.

ex: Sucrose(s)  $C_{12}H_{22}O_{11}(s)$

IMF: London-Dispersion  
H-Bonding  
d-d

(weaker than, say, ion-ion)

Low MP/BP

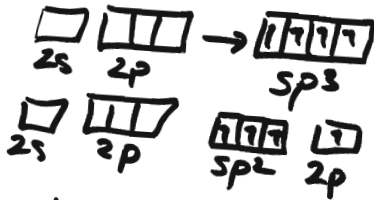
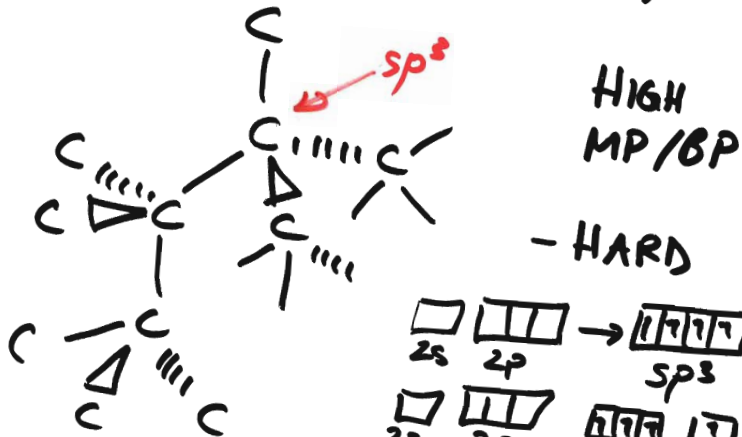
ex  $H_2O(s)$ ,  $I_2(s)$ ,  $P_4(s)$

SOFT, POOR conductors.

### 3. Network Covalent Crystals,

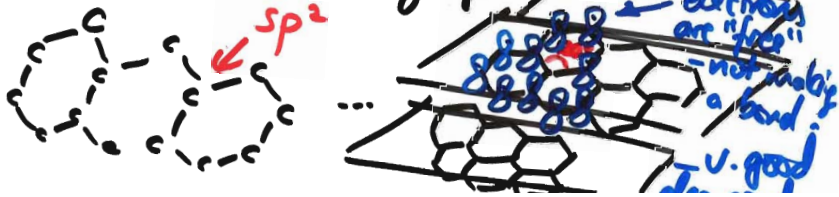
- element, or simple compounds.
- 3D-network of covalent bonds linking all atoms together (in a web)

ex: DIAMOND (C, diamond)



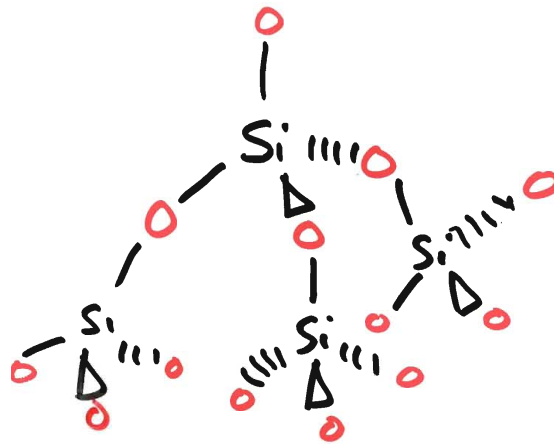
### GRAPHITE

(C, graphite)



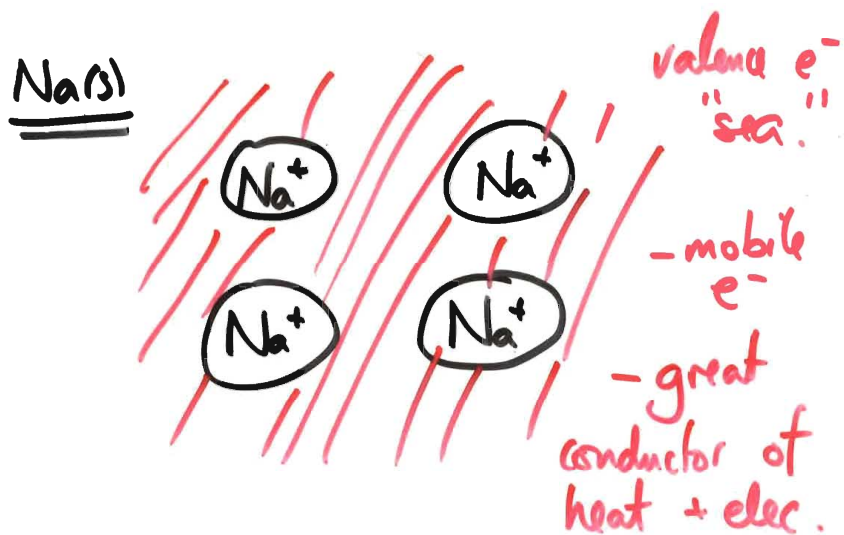
Quartz:  $SiO_2$

Network Covalent Solid.  
- like diamond.



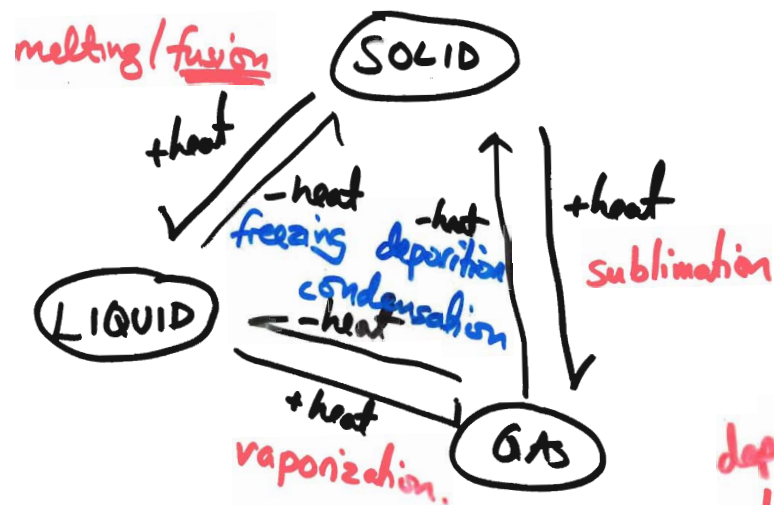
## (4) Metallic Crystals

ex: Na(s)  
Mg(s)  
Al(s)



Na(s) mp = 98°C	Mg(s) mp = 650°C	Al(s) m.p. = 2000°C
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## Phase Changes



### Liquid-Vapor equilibrium

