

AGGREGATES Assignment

- A/ Use the internet to answer the following:
- How are crystals formed?
 - What determines the physical properties of the crystals formed?
 - In terms of chemical bonds, what are the two main factors that determine the hardness of a solid?
 - Identify the main type of intermolecular bonding and the type of crystal for each of the following: SiO_2 , Na_2S , CH_4 , C , Cr , CaO
 - How does the melting point of a crystal relate to the type of intermolecular bond present?
 - Explain why metals are generally malleable, ductile and flexible.
 - Match the solids, NaBr , V , P_2O_5 and SiO_2 to the property listed below:
 - high melting point, conducts electricity
 - low melting point, soft
 - high melting point, soluble in water
 - very high melting point, non-conductor
 - Use the theory of intermolecular bonding to explain the sequence of boiling points in the following alkyl bromides: CH_3Br (4°C), $\text{C}_2\text{H}_5\text{Br}$ (38°C), $\text{C}_3\text{H}_7\text{Br}$ (71°C).
 - Name the intermolecular forces present in the following compounds and account for the difference in their boiling points: CH_4 (-164°C), NH_3 (-33°C), BF_3 (-100°C).
 - Name the forces acting between particles in each of the following substances:
 - Hexane, C_6H_{14}
 - 1-butanol, $\text{C}_4\text{H}_9\text{OH}$
 - Ethylamine, $\text{C}_2\text{H}_5\text{NH}_2$
 - Chloroethane, $\text{C}_2\text{H}_5\text{Cl}$
 - Calcium carbonate, CaCO_3
 - Diamond, C_n
- B/
- Draw two-dimensional diagrams showing the structure of sodium metal and sodium chloride crystal. From these structures explain why the metal is ductile whereas the salt is brittle.
 - Identify the type of aggregate and the intermolecular bonds that hold the crystal together.

a) Ar	e) Si
b) H_2O	f) Al
c) CH_4	g) CaCl_2
d) CO	h) NaCN
 - Why do ammonia, water and hydrogen fluoride have abnormally high boiling points?
 - Which substance in the following list do you regard as the best example of: (Na , diamond, Cl_2 , Ne, ICl , LiF , H_2 , MgO) Use each one only once.
 - a solid with intermolecular covalent bonding
 - molecule(s) with intramolecular covalent bonding
 - an ionic solid
 - a monatomic molecule
 - an electrically conducting solid

5. Classify the following substances as ionic, molecular, metallic crystals or network solids.
- a) lattice composed of positive ions sharing electrons with neighbouring positive ions.
 - b) solid only at extremely low temperatures
 - c) lattice composed of atoms bonded covalently to neighbouring atoms.
 - d) extremely hard, not workable and a poor conductor of heat and electricity
 - e) a good conductor only when molten
 - f) a good conductor of heat and electricity
6. Divide the compounds into two groups, one in which each compound will conduct electricity as a liquid above its melting point and one in which each compound will not conduct as a liquid above the melting point.

BeCl_2 , MgCl_2 , AlCl_3 , Cl_4 , BCl_3 , BeH_2 , NaF , CaBr_2

liquid conducts

liquid doesn't conduct