Materials Science and Engineering

TOPIC 1 TOPIC 1: INTRODUCTION. FAMILIES OF MATERIALS APPLICATIONS AND SELECTION CRITERIA. BONDING IN SOLIDS.

Evaluation Test

Important: Mark the right answer with a X. The correct answers will mark + 1 points while the incorrect answers will mark as -0.33 points. Non answered questions will not mark nor positively nor negatively. The resulting mark will not be smaller than 0 in any case. There is only one correct answer per question. Good luck!

In materials with ionic bonding:	
	When the ion size increases, the lattice energy increases.
	The melting temperature usually decreases when the valance of ions increases.
X	**When the lattice energy is high, usually the melting point is high.**
	When the electronegativity difference of the ions is low, the percentage of covalent character of the bond is low.

A material with a high bonding energy between atoms is expected to have:	
X	**High melting point.**
	High coefficient of thermal expansion.
	Low stiffness.
	Good electrical conductivity.

The strength of atomic or molecular bonds in solids:	
	Is higher for materials with metallic bonding than for materials with ionic bonding.
X	**Is usually higher in materials with high melting point.**
	It decreases with increasing lattice energy.
	Is lower for directional bonds.

In polymeric materials:	
	Bonding between the atoms of molecules within the chains is primarily due to non-directional covalent bonds.
	Bonding in-between the chains is due to covalent bonds.
X	**Bonding between the atoms of molecules within the chains is particularly directional with a fixed angle between the bonds.**
	Bonding between the atoms of molecules within the chains is primarily due van der waals bonds.

In materials with metallic bonding:	
	Electrical charge is transferred by the movement of entire atoms.
X	**Atoms move past one another with relative ease when a force is applied, causing deformation.**
	Electrons are bonded by secondary Van der Waals bonds.
	Bonding is particularly directional.

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