

How do you identify ionic substances?	How do you identify metallic substances?	How do you identify molecular substances?	How do you identify polymers?
Description of ionic bonding.	Description of metallic bonding.	Description of molecular bonding.	Description of bonding in polymers.
Description of bonding in silicon dioxide.	Description of bonding in graphite.	Description of bonding in diamond.	How do you identify a 3D covalent network solid
Ionic solids have very high melting point because?	Ionic solids do not conduct electricity because?	Molten or dissolved ionic solid conduct electricity because?	Ionic solids are brittle and will shatter when hit with a hammer because?

Made up of long chains of covalently bonded atoms.	Non-metals only.	Metals only	A metal + a non-metal
Polymers are chains which form due to covalently bonded atoms (repeating units). The chains are held together by very weak intermolecular forces of attraction to form a 3D lattice.	_____ is a molecular substance which forms due to strong covalent bonds within the molecule. The molecules are held together by very weak intermolecular forces of attraction between the molecules to form a 3D lattice.	_____ is a metallic substance which forms due to electrostatic attraction between metal cations and a pool of delocalised electrons to form strong non-directional metallic bonds to form a 3D lattice.	_____ is an ionic substance which forms due to the electrostatic attraction between metal cations and non-metal anions to form strong directional ionic bonds to form a 3D lattice.
If it is silicon dioxide, graphite or diamond.	Diamond is made up of covalently bonded carbon atoms. Each carbon atom is bonded to four other carbon atoms forming a large 3D covalent lattice	Graphite is made up of 2D sheets as each carbon atom is bonded to 3 other carbon atoms. This leave a extra electron to move throughout the network. These 2D sheets are held together by very weak intermolecular forces of attraction to form a 3D covalent lattice.	Silicon dioxide is made up of covalently bonded silicon and oxygen atoms to form a large 3D covalent lattice.
Because when hit the like charged ions align and repel causing the ionic lattice to shatter.	There is available charged ions as they are no longer bonded in their 3D ionic lattice.	There is no available charged particles (ions or electrons) as the ions are bonded in their 3D ionic lattice.	Ionic solids have very strong ionic bonds which require a large amount of heat energy to melt from a solid to a liquid.

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Ionic substances are very hard because?	Ionic substances are soluble because?	Metallic substances have very high melting points because?	Metallic substances conduct electricity because?
Metallic substances are good thermal conductors because?	Metallic substances are good electrical conductors because?	Metallic substances have a high density because?	Metallic substances are malleable because?
Metallic substances are ductile because?	Metallic substances are sonorous because?	Metallic have a high lustre because?	Metallic substances are insoluble because?
Molecular substances have low melting points because?	Molecular substances do not conduct electricity because?	Molecular substances are insoluble in water because?	Molecular substances are soft because?

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The free moving delocalised electrons which can carry an electrical current.	Metallic solids have very strong metallic bonds which require a large amount of heat energy to melt from a solid to a liquid.	The attraction between the water molecules and the ions are strong than the electrostatic attraction between the ions themselves.	The very strong ionic bonds require a large amount of force to deform or break them.
The non-directional metallic bonds allow the atoms to slide past one another without breaking the strong metallic bonds.	There is a high mass of metal atoms per unit volume making them denser.	The loosely held delocalised electrons can carry an electrical current.	The loosely held delocalised electrons can vibrate and pass on heat energy to neighbouring atoms.
The metallic bonds are too strong to be overcome by the attraction between water molecules and metal atoms.	There is a high mass of metal atoms per unit volume making them reflect light making them shiny.	The free moving delocalised electrons can vibrate to create sound.	The non-directional metallic bonds allow the atoms to slide past one another without breaking the strong metallic bonds.
The very weak intermolecular forces of attraction require a very little amount of force to deform or break them.	The attraction between the water molecules themselves are stronger than the attraction between the water molecules and the molecular substance.	There is no available charged particles (ions or electrons) in molecular substances.	The very weak intermolecular forces of attraction between the molecule require very little energy to overcome to melt the solid to liquid.

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Polymer substances are very soft and flexible because?	Polymer substances are insoluble because?	Polymer substances do not conduct electricity because?	Polymer substances are poor thermal conductors because?
Silicon dioxide has a very high melting point because?	Silicon dioxide is insoluble because?	Silicon dioxide is a very hard substance because?	Diamond has a very high melting point because?
Diamond is insoluble because?	Diamond is a very hard substance because?	Molecular substances have a very low boiling point because?	Graphite is insoluble because?
Graphite is a very hard substance because?	Graphite has a very high melting point because?	Graphite is a good electrical conductor because?	Graphite has a very good lubricant because?

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There are no free moving delocalised electrons to vibrate and pass on heat energy. Thus, they are good insulators.	There is no available charged particles (ions or electrons) in polymer substances	The attraction between the water molecules themselves are stronger than the attraction between the water molecules and the polymer substance.	The very weak intermolecular forces of attraction that hold the covalently bonded chains are easily overcome making them soft and flexible.
Diamond has very strong covalent bonds which require a large amount of heat energy to melt from a solid to a liquid.	The very strong covalent bonds require a large amount of force to deform or break them.	The covalent bonds are too strong to be overcome by the attraction between the water molecules and the 3D covalent substance.	Silicon dioxide has very strong covalent bonds which require a large amount of heat energy to melt from a solid to a liquid.
The covalent bonds are too strong to be overcome by the attraction between the water molecules and the 3D covalent substance.	The very weak intermolecular forces of attraction between the molecule require very little energy to overcome to boil the liquid into a gas.	The very strong covalent bonds require a large amount of force to deform or break them.	The covalent bonds are too strong to be overcome by the attraction between the water molecules and the 3D covalent substance.
The very weak intermolecular forces of attraction between the 2D sheets of graphite are easily overcome allowing the sheets to slide over one another making them slippery.	The free moving delocalised electrons which can carry an electrical current.	Graphite has very strong covalent bonds which require a large amount of heat energy to melt from a solid to a liquid.	The very strong covalent bonds require a large amount of force to deform or break them.

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Metallic substances are very hard because?	Polymer substances are reasonably hard because?		

		There are many covalently bonded atoms which require a large amount of force to deform the substance.	The very strong metallic bonds are requiring a large amount of force to deform or break the substance.