

## Review: Types of Structure and Properties

	Giant Lattices			Simple Molecular	Atomic
	Ionic	Covalent	Metallic		
Where this type of structure is found.	Compounds formed between metals and non-metals	Group IV elements and Some of their compounds	Metals	In some elements and in some compounds formed between non-metals.	Noble gases
Some examples	KCl, CaCl <sub>2</sub> , MgO	Carbon: graphite, diamond, Bucky-balls, SiC, SiO <sub>2</sub>	Cu, Al, Au	H <sub>2</sub> O, CO <sub>2</sub> , NH <sub>3</sub>	Xe, Kr, Ar
Particles present	Ions	Atoms - in a giant lattice structure	Positive kernels surrounded by a sea of delocalised electron cloud	Molecules held by Van-der-Waals' forces	Single atoms held by London dispersion forces
Attractions that hold particles together	Electrostatic forces between ions in a 3-D lattice structure	Van-der -Waals', dipole-dipole, hydrogen- bonds	Electrostatic between positive kernels and the delocalised electron cloud	Van-der -Waals', dipole-dipole, hydrogen- bonds	London dispersion forces
Usual physical state at R.T.P	Crystalline solid	Volatile liquids or gases	Solid	Volatile liquids or gases	Gas
m.p, b.p,	Relatively high, >500°C, >100°C	Generally high	High	Low (depends on intermolecular forces)	Very low

Hardness	Dense, brittle, easily broken under stress	Hard or Soft	Malleable, ductile	Soft and waxy	N/A
Electrical Conductivity: solid, molten, aqueous solution	Solid: Poor Molten: Good Aqueous Solution: Good	Solid: Poor Molten: Poor Aqueous Solution: Poor (graphite: good)	Solid: good Molten: good Aqueous Solution: Insoluble/React	Solid: Poor Molten: Poor Aqueous Solution: Poor (Polar covalent: Ionization: Strong or Weak electrolytes)	Non-conductor
Solubility in: non-polar solvent, polar solvent	Generally soluble in polar solvents, insoluble in non-polar solvents	Generally insoluble	Insoluble	Sometimes soluble in polar solvents, generally soluble in non-polar solvents	Sparingly soluble