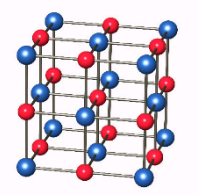
Structure and Bonding



The key areas of study in this topic are:

- Ionic, covalent and metallic bonding
- The structure and properties of ionic, covalent and metallic substances

By the end of this topic I should be able to:	Start	End
1.28 Explain how a covalent bond is formed when a pair of electrons is shared between two atoms		
1.29 Recall that covalent bonding results in the formation of molecules		
1.30 Recall the typical size (order of magnitude) of atoms and small molecules		
1.31 Explain the formation of simple molecular, covalent substances, using dot and cross diagrams, including hydrogen, hydrogen chloride, water, methane, oxygen and carbon dioxide		
1.21 Explain how ionic bonds are formed by the transfer of electrons between atoms to produce cations and anions, including the use of dot and cross diagrams		
1.27 Explain the structure of an ionic compound as a lattice structure a consisting of a regular arrangement of ions b held together by strong electrostatic forces (ionic bonds) between oppositely-charged ions		
1.32 Explain why elements and compounds can be classified as: a) ionic b) simple molecular (covalent) c) giant covalent d) metallic and how the structure and bonding of these types of substances results in different physical properties, including melting point and boiling point, solubility in water and ability to conduct electricity (as solids and in solution)		
1.33 Explain the properties of ionic compounds limited to: a high melting points and boiling points, in terms of forces between ions b whether or not they conduct electricity as solids, when molten and in aqueous solution		
1.34 Explain the properties of typical covalent, simple molecular compounds limited to: a low melting points and boiling points, in terms of forces between molecules (intermolecular forces) b poor conduction of electricity		
1.35 Recall that graphite and diamond are different forms of carbon and that they are examples of giant covalent substances		
1.36 Describe the structures of graphite and diamond		
1.37 Explain, in terms of structure and bonding, why graphite is used to make electrodes and as a lubricant, whereas diamond is used in cutting tools		
1.38 Explain the properties of fullerenes including C60 and graphene in terms of their structures and bonding		
1.39 Describe, using poly(ethene) as the example, that simple polymers consist of large molecules containing chains of carbon atoms		
1.40 Explain the properties of metals, including malleability and the ability to conduct electricity		
1.41 Describe the limitations of particular representations and models, to include dot and cross, ball and stick models and two- and three-dimensional representations		
1.42 Describe most metals as shiny solids which have high melting points, high density and are good conductors of electricity whereas most non-metals have low boiling points and are poor conductors of electricity		
5.5C Explain, using models, why converting pure metals into alloys often increases the strength of the product		