

C1 Topic 2 Chemical Bonds, Ionic, Covalent and Metallic

| Ionic Bonding | |
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| 1. What type of elements does ionic bonding occur between? | Metal and a non-metal |
| 2. What sort of substance loses electrons during ionic bonding? | metals |
| 3. What sort of substance gains electrons during ionic bonding? | Non-metals |
| 4. What sort of ions do metals form? | positive |
| 5. What sort of ions do non-metals form? | negative |
| 6. Ionic compounds have a structure | Giant |
| 7. What holds ionic compounds together? | Strong electrostatic forces of attraction |
| Skills | |
| 8. What is the charge on a Lithium ion? | +1 |
| 9. What is the charge on an oxygen ion? | -2 |
| 10. What is the charge on a magnesium ion? | +2 |
| 11. What is the charge on a chloride ion? | -1 |
| 12. Will sodium loose or gain an electron? | Gain |
| 13. Will bromine loose or gain an electron? | Loose |
| Giant Ionic Lattice Structures | |
| 14. Describe the melting and boiling points of giant ionic lattices | High melting and boiling points |
| 15. When do ionic lattices conduct electricity? | When molten or dissolved in water |
| 16. Why do giant ionic lattices have high melting and boiling points? | Large amounts of energy needed to break the many strong bonds |
| 17. Why do ionic lattices conduct electricity when molten or dissolved in water? | The ions are free to move and so charge can flow |
| 18. Why do ionic lattices not conduct electricity when solid? | The ions are fixed in the lattice so the charge cannot flow |
| Covalent Bonding | |
| 19. What sort of elements does covalent bonding occur between? | 2 non-metals |
| 20. What happens to the electrons during covalent bonding? | Electrons are shared between atoms |
| 21. Give 3 examples of simple molecules | H ₂ O, CO ₂ , Cl ₂ , I ₂ , H ₂ , NH ₃ , O ₂ , CH ₄ |
| 22. Diamond, graphite and silicon dioxide all have what type of structure? | Giant Covalent |
| 23. Give a limitation of the ball and stick model to show simple molecules | It doesn't show the shape around each |

| Properties of Simple Molecules | |
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| 24. Describe the melting and boiling points of simple covalent molecules | Low melting and boiling points |
| 25. Do simple covalent molecules conduct electricity? | No |
| 26. What state are simple molecules usually found in? | Gases or liquids |
| 27. Which forces are overcome when a simple molecule is heated? | Weak intermolecular force between the molecules |
| 28. Why do simple molecules not conduct electricity? | They do not have an overall electrical charge |
| Polymers | |
| 29. What links the atoms in a polymer | Strong covalent bonds |
| 30. Why are polymers usually solid at room temperature? | They have relatively strong intermolecular forces |
| Giant Covalent Structures | |
| 31. Describe the melting and boiling points of giant covalent structure | High melting and boiling points |
| 32. What links the atoms in giant covalent structures? | Strong covalent bonds |
| 33. How many bonds does each carbon make in diamond? | 4 |
| 34. How many bonds does each carbon make in graphite? | 3 |
| 35. Why is diamond hard? | It has a large amount of strong covalent bonds |
| 36. Describe the structure of graphite | Hexagonal rings formed in layers |
| 37. Why does graphite conduct electricity? | Each carbon has a delocalised electron that can move so the charge can flow |
| 38. Why is graphite soft and slippery? | It has weak intermolecular forces between the layers so the layers can slide |
| Graphene and Fullerenes | |
| 39. Describe the structure of graphene | A single layer of graphite |
| 40. Describe the structure of fullerenes | Hexagonal rings of carbon atoms |
| 41. Describe the structure of carbon nanotubes | Cylindrical fullerenes with a very surface area to volume ratio |
| 42. Give a use of fullerenes | Carbon nanotubes, electronics, materials |
| States of Matter | |
| 43. What does (s), (l), (g) and (aq) stand for? | Solid, liquid, gas, aqueous |
| 44. What processes happen at the melting point? | Melting and freezing |

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| 45. What processes happen at the boiling point? | Boiling and condensing |
| 46. Why do some substances have a higher melting and boiling point? | They have stronger forces between the particles |
| Metals and Alloys | |
| 47. Describe the structure of a metal | Giant structure of atoms arranged in a regular pattern |
| 48. What are the electrons like in the outer shell of a metal atom? | Delocalised and free to move through the whole structure |
| 49. Why are alloys stronger than pure metals | They contain different sized atoms which distort the layers so they can't slide |
| 50. Why can metals be bent and shaped? | Because the atoms are arranged in layers which can slide over each other |
| 51. Why are metals good conductors of electricity and thermal energy (heat) | The delocalised electrons can carry the electric charge and they can pass on the energy |
| Higher Tier Only | |
| 52. Describe 3 limitations of the particle diagrams to show the states of matter | <ul style="list-style-type: none"> • They show no forces • All the particles are represented as spheres • The spheres are solid |