**Summary: Properties of different bonding structures**

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| **Structure** | **Properties** | **Explanation** |
| [http://www.bbc.co.uk/schools/gcsebitesize/science/images/gcsechem_51.gif](http://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=wRqtgOYegQ0KiM&tbnid=fPCkYV2vLGmoVM:&ved=&url=http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_gateway/periodic_table/ionicrev4.shtml&ei=NvRbUreOJ8eo0AXzqYGgDw&bvm=bv.53899372,d.d2k&psig=AFQjCNEbQR797UwLrGNN-XaXamt3efqxjA&ust=1381844407078424)**Giant ionic structure**  *Lattice of positive and negative ions strongly attracted together* | **High** melting points and boiling points. | The **strong electrostatic forces** between positive and negative ions require lots of energy to overcome. |
| **Do not conduct** electricity as **solids.**  **Conduct** electricity as **molten** **liquids/solutions**. | **Solid:** the ions are in **fixed positions**.  **Molten liquid/solution:** The ions are **free to move**. |
| **Simple molecular structure**  *Weak intermolecular forces*  *Strong covalent bonds* | **Low** melting and boiling points. | Although the covalent bonds between the atoms in molecules are strong, the **intermolecular forces** between the molecules are **weak** and little energy is needed to overcome them. |
| **Do not conduct** electricity. | The molecules are **neutral** so there are **no moving charges**. |
| **Giant covalent/macromolecular structure**  **C2**  *Strong covalent bonds* | **High** melting and boiling points. | There are **strong covalent bonds** throughout the structure which require lots of energy to overcome. |
| **Do not conduct** electricity, except **graphite**. | **Diamond/Silica:** There are **no moving charges**.  **Graphite:** There are **delocalised electrons**. |
| **Metallic structure**  *Delocalised electrons from the outer shells of the metal atoms*  *Positive ions* | **High** melting and boiling points. | The **strong electrostatic forces** between positive ions and delocalised electrons require lots of energy to overcome. |