

Chemguide – questions

MOLECULAR STRUCTURES

- Which of the following are broken when water boils?
covalent bonds
hydrogen bonds
van der Waals dipole-dipole interactions
van der Waals dispersion forces
 - Draw a simple diagram to show the structure of ice, making clear the nature of the bonds involved. You only need to draw five water molecules.
 - Explain why ice floats on water.
- Propane, C_3H_8 , is a gas which is insoluble in water. Explain why
 - propane is a gas at room temperature;
 - propane doesn't dissolve in water.
 - Although propane won't dissolve in water, it will dissolve in liquid hexane, C_6H_{14} . Explain why that is possible.
 - Ethanol (ordinary alcohol), CH_3CH_2OH , is the same sort of shape and size as propane, but is a liquid at room temperature, and does dissolve freely in water. Explain why
 - ethanol is a liquid at room temperature;
 - ethanol does dissolve in water.
 - (You will have to think about this question!) Can you suggest why pentan-1-ol (another member of the alcohol family), $CH_3CH_2CH_2CH_2CH_2OH$, is only very sparingly soluble in water?
- There are two forms of poly(ethene) (often just called polythene) – high density poly(ethene), HDPE, and low density poly(ethene), LDPE. HDPE is stronger than LDPE and has a slightly higher melting point. Explain the differences between the two types in terms of the structure of their molecules.
- Explain why iodine is a solid with a low melting and boiling point, almost insoluble in water, but soluble in organic solvents such as hexane, and is also a non-conductor of electricity.

(I am not asking specifically for the structure of an iodine crystal, because I suspect that most syllabuses at this level won't want it. If yours does, draw it, and check your answer against the diagrams on the Chemguide page.)