

- Benzoic acid has a low solubility in water at pH 7, but is very soluble in aqueous solutions of greater pH. Explain this observation, using chemical equations where appropriate.

**Benzoic acid has a low solubility in water because of the relatively large hydrophobic aromatic ring. It is a weak acid so exists primarily as the undissociated acid at pH 7. At high pH, it can react with  $\text{OH}^-$  ions to form the benzoate ion. This species is water soluble because it is charged and hence is easily solvated by the polar water molecules.**

