

5.5 EXERCISE 1 - DEPROTONATION AND LIGAND EXCHANGE

1. Write equations to show the reactions taking place in the following processes, and state the types of reaction taking place.
 - a) If aqueous sodium hydroxide solution is added to a solution of iron (II) chloride, a dirty green precipitate appears which is insoluble in excess sodium hydroxide.
 - b) If aqueous ammonia is added to a solution of manganese (II) sulphate, a buff precipitate appears which is insoluble in excess ammonia.
 - c) If aqueous sodium hydroxide solution is added to a solution of chromium (III) chloride, a pale green precipitate appears which dissolves in excess sodium hydroxide to give a green solution.
 - d) If aqueous ammonia is added to a solution of copper (II) sulphate, a pale blue precipitate appears which dissolves in excess ammonia to give a deep blue solution.
 - e) If concentrated hydrochloric acid is added to an aqueous solution of cobalt (II) nitrate, the solution turns blue. If the mixture is then diluted, it reverts to its original pink colour.
 - f) If aqueous sodium carbonate is added to an aqueous solution of aluminium sulphate, a white precipitate is formed and a gas is given off.
 - g) If aqueous sodium carbonate is added to an aqueous solution of cobalt (II) sulphate, a pink precipitate is formed and no gas is given off.
 - h) If dilute sulphuric acid is added to a yellow solution of sodium chromate (VI), the solution turns orange.
2. Explain why a 1.0 mol dm^{-3} solution of iron (II) sulphate has a higher pH than a 1.0 mol dm^{-3} solution of iron (III) sulphate.
3. Explain why the reaction between $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ and edta^{4-} ions is thermodynamically favoured.