AS level Chemistry A

H032/02 Depth in chemistry

Question Set 9

1. This question is about halogens.

(a) Bromine is used to extract iodine from a solution containing iodide ions.

(i) Write an ionic equation for the reaction.

[1]

(ii) Explain why iodine is less reactive than bromine.

[3]

(b) Iodine can be used for the small-scale purification of drinking water.

(i) Iodine reacts with water as shown below.

$$I_2 + H_2O \rightleftharpoons HI + HIO$$

Using oxidation numbers, explain why this reaction is a disproportionation.

[3]

(ii) Chlorine is used to purify water on a large scale.

State **one** disadvantage of using chlorine for the purification of drinking water.

[1]

(c) Hydrogen reacts with chlorine to form hydrogen chloride, HC*l*:

$$H_2(g) + Cl_2(g) \rightarrow 2HCl(g) \qquad \Delta H = -184\,kJ\,mol^{-1}$$

Table 3.1 shows bond enthalpies.

Bond	Bond Enthalpy/kJ mol^{-1}
H–H	+436
C*l*–C*l*	+243

Table 3.1

Calculate the bond enthalpy, in kJ mol^{-1}, for the H–C*l* bond from the information above.

[2]

(d) 'Enthalpy change of vaporisation' is the enthalpy change when one mole of a substance changes from a liquid to a gas at its boiling point.

(i) Write an equation, including state symbols, to represent the enthalpy change of vaporisation of bromine.

[1]

(ii) Suggest whether the enthalpy change of vaporisation of bromine is exothermic or endothermic.

Explain your answer.

[1]

Total Marks for Question Set 3: 12