Chemical equilibria, Le Chatelier's principle and Kc – A2 2022 Chemistry P2

1. June/2022/Paper_7405/2/No.2

0 2 Tetrafluoroethene is made from chlorodifluoromethane in this reversible reaction.

$$2\,CHClF_2(g) \rightleftharpoons C_2F_4(g) + 2\,HCl(g) \qquad \Delta H = +128\ kJ\ mol^{-1}$$

A 2.00 mol sample of $CHClF_2$ is placed in a container of volume 23.2 dm^3 and heated. When equilibrium is reached, the mixture contains 0.270 mol of $CHClF_2$

0 2 . 1 Calculate the amount, in moles, of C_2F_4 and of HCl in the equilibrium mixture.

[2 marks]

Amount of C_2F_4 _____ mol

Amount of HCl _____ mol

0 2 . 2 Give an expression for K_c for this equilibrium.

[1 mark]

K_c

0 2 . 3 Calculate a value for K_c

Give its units.

[3 marks]

K_c _____ Units _____

0 2 . 4 State and explain the effect of using a higher temperature on the equilibrium yield of tetrafluoroethene.

[3 marks]

Effect on yield _____

Explanation _____

_____

_____

_____

_____

0 2 . 5 Chemists provided evidence that was used to support a ban on the use of chlorodifluoromethane as a refrigerant.

Many refrigerators now use pentane as a refrigerant.

State the environmental problem that chlorodifluoromethane can cause.

Give **one** reason why pentane does not cause this problem.

[2 marks]

Environmental problem _____

_____

Reason why pentane does not cause this problem _____

_____

_____

_____