**Reversible Reactions - Equilibria**

Many chemical reactions are reversible. This means that they go in both directions.



E.g. CuSO4.5H2O(s) ⇌ CuSO4(s) + 5H2O(l)



E.g. NH4Cl(s) ⇌ NH3(g) + HCl(g)



**Dynamic Equilibrium**

If a reversible reaction takes place in a sealed container it will reach dynamic equilibrium which has 3 main features



1. Both the forward and reverse equations are occurring
2. The rate of the forward and reverse reactions is the same
3. The concentrations of reactants and products remains constant

**Position of Equilibrium**

If we change the conditions, the position of equilibrium can shift to the left or to the right

*Temperature*

Increasing the temperature favours the endothermic reaction and equilibrium will shift accordingly.

E.g. CuSO4.5H2O(s) ⇌ CuSO4(s) + 5H2O(l) ∆H = +11.7 kJ/mol



*Pressure*

Increasing pressure will shift equilibrium to the side with fewer moles of gas.

E.g. N2(g) + 3H2(g) ⇌ 2NH3(g)



*Catalysts*

Catalysts increase the rate of reaction of both the forward and reverse reactions so have no effect on the position of equilibrium.

**Example**

Suggest what would happen if both the temperature and pressure were increased in the reaction below



2NO2(g) ⇌ N2O4(g) ∆H = -57 kJ/mol

