

Chemistry 2, HW 13

Equilibrium is the state where the forward and reverse reactions occur at the same rate, so the concentrations of reactants and products remain constant over time.

Short definition of equilibrium constant (K_c): It is the ratio of the concentrations of products to reactants at equilibrium, each raised to the power of their coefficient in the balanced equation, at fixed temperature.

Example: $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$

$$K_c = [\text{NH}_3]^2 / [\text{N}_2][\text{H}_2]^3$$

If K_c is large, the equilibrium mixture contains mostly ammonia, if it is small, the mixture has mostly nitrogen and hydrogen gases.

Questions:

1. Two reactions have identical ΔH values. Can one still release heat faster than other? Why?
2. Is it possible for a reaction to have very low activation barrier and still be slow? Why?
3. If a reaction equation is multiplied by 2, how the new equilibrium constant is changed compare to the original one?