

Chem 130 chp. 15

Profession



Chp. 15 Chemical equilibrium: Occurs when a reaction and its reverse reaction (opposing reactions) proceed at the same rate At equilibrium the rate at which products are produced from reactants equals the rate at which reactants are produced from products At equilibrium a particular ratio of concentration terms equals a constant The composition of an equilibrium mixture does not change with time K_c : equilibrium constant 15. 2 Law of mass action: expresses the relationship between the concentrations of the reactants and products present at equilibrium 5. 3 * * LARGE VALUE OF K_c : Equilibrium mixture contains more products than reactants = product side (right side) $K > 1$ *SMALL VALUE OF K_c : Equilibrium mixture contains less products than reactants = reactant side (left side) $K < 1$ The equilibrium-constant expression for a reaction written in one direction is the reciprocal of the one for the reaction written in the reverse direction Multiplying all the stoichiometric coefficients by a number gives the equilibrium constant for the original reaction raised to that number 15. 4

Concentrations of PURE SOLIDS and LIQUIDS DO NOT appear in equilibrium expression L S 15. 5 ICE TABLES 15. 6 15. 7 Le chateliers principle: IF a system at equilibrium is disturbed by a change in temperature, pressure, or the concentration of one of the components, the system will shift its equilibrium position so as to counteract the effect of the disturbance % of NH_3 at equilibrium decreases with increasing temperature and increases with increasing pressure * * Endothermic reaction: increase in temperature shifts equilibrium to right reactant absorbs heat Increasing T results in an increase K * Exothermic reaction: Temperature increase shifts equilibrium to left product gives off heat Increasing T results in decreasing K * * Increasing

pressure (decreasing volume): equilibrium shifts in the direction producing the smaller number of moles of gas will reduce the pressure * * Decreasing pressure (increasing volume): equilibrium shifts in the direction producing the larger number of moles of gas produces more pressure