

General Chemistry II Chapter-by-Chapter detailed learning objectives

Chemical Equilibrium

1. Write the equilibrium expression for a reversible reaction.
2. Realize the significance of the K value in determining extent of reaction.
3. Understand the K value manipulations (multiplying the reaction coefficients by a factor, reversing a reaction and adding reactions)
4. Use the relationship involving K_c and K_p .
5. Write equilibrium expressions for heterogeneous equilibria (involving other phases of matter).
6. Recall the significance of the Q value and predict the direction of a reaction given initial states of concentration or pressure for each reactant and product.
7. Calculate equilibrium concentrations and partial pressures of all reaction species. Learn how to set up an ICE table.
8. Set up ICE tables for equilibrium calculations and be able to solve the equation using the quadratic equation or use the simplifying assumption if justified (when K is very small compared to the concentration value)
9. Set up calculation scheme to find equilibrium concentrations for a reaction involving a large K value. For these reactions we set up an ICF table and assume a complete reaction first and next we set up an ICE table and approach the equilibrium state by from the "reverse" direction.
10. Recall the Le Chatelier's principle (and stress types) to predict the reaction shift toward a new equilibrium state upon a stress.
11. Calculate concentration change as a stress and calculate new equilibrium concentrations.
12. Learn practical applications of Le Chatelier's principle in improving product yield of equilibrium type reactions such as production of ammonia.