AP CHEMISTRY CHAPTER 16: SOLUBILITY AND COMPLES ION EQUILIBRIA OUTLINE

16.1: Solubility Equilibria and the Solubility Product

Solubility

Saturated

Solubility product constant (Ksp)

Relative solubilities

1. Salts producing the same number of ions. For example

AgI Ksp= 1.5 x 10-16

CuI Ksp = 5.0 x 10-12

CaSO4 Ksp = 6.1 x 10-5

1. Salts producing different numbers of ions

CuS Ksp = 8.5 x 10-45

Ag2S Ksp = 1.6 x 10-49

Bi2S3 Ksp = 1.1 x 10-75

Common ion effect

Consider a 0.100 M solution of silver nitrate in which solid silver chromate has been added (Ksp = 9.0 x 10-12)

Determine the major species. Determine the equilibrium reaction. Calculate the solubility of silver chromate. Compare the solubility of silver chromate both alone and in the presence of silver nitrate. (Don’t forget Le Chatelier when you look at answers)

pH and solubility (Remember the acid-base characteristics of salts)

16.2: PRECIPITATION AND QUALITATIVE ANALYSIS

Using Q and Ksp: A Quick Review

Selective precipitation

Qualitative Analysis

Group I-Insoluble chlorides

Group II- Sulfides insoluble in acid solution

Group III-Sulfides insoluble in basic solution

Group IV-insoluble carbonates

Group V-Alkali metals and ammonium ions

Example of qualitative analysis

16.3: EQUILIBRIA INVOLVING COMPLEX IONS

Complex Ion

Ligands

 Coordination number

 Stability constants

Complex ions and solubility: An overview concentrating on its usefulness in qualitative analysis

Aqua regia