Analytical chemistry (5th Edition)

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1 Chapter 11

1.

$$\begin{gathered}[Fe^{2+}][OH^-]^2 = K_{sp} \\ [Fe^{2+}] = 0.02 * 0.01\% = 2 * 10^{-6} mol/L \\ pH = 14 + lg[OH^-] = 9.30 \\ \alpha_{Fe(OH)^{2+}} = 1 + \beta[OH^-] = 1 + 1 * 10^4 * [OH^-] \\ [Fe^{2+}] = [Fe^{2+}]_{original} * \alpha_{Fe(OH)^{2+}} \\ [Fe^{2+}][OH^-] = K_{sp} \\ pH = 9.34 \end{gathered} \tag{1}$$

2.

$$\begin{gathered} Let: M_{H_2A} = M \\ \frac{0.346}{M - 2 + M_{Ba}} = 20.2 * 10^{-3} * 0.0996/2 \\ M = 208.95 \end{gathered} \tag{2}$$

3.

$$\begin{gathered} 10mg * 0.01 = 0.1mg \\ 10mg * 0.01 * 0.01 = 0.001mg \\ (1 - 0.001) * \frac{1}{100} = 0.1mg \end{gathered} \tag{3}$$

5.

$$\begin{gathered} D = 95\%/5\% = 19 \\ A = 0.198 = \epsilon * 95\% * \frac{103.5 * 10^{-6}}{25 * 10 * 10^{-3}} \\ \epsilon = 1.04 * 10^5 L \cdot mol^{-1} \cdot cm^{-1} \end{gathered} \tag{4}$$

6.

$$E = \frac{D}{D + \frac{V_w}{V_o}} = 0.5$$
$$(0.5)^N \leq 0.5\% \tag{5}$$
$$N = 8$$

7.

$$D = \frac{83\%}{17\%} = 4.88 \tag{6}$$

8.

$$E = \frac{D}{D + \frac{V_w}{V_o}} = \frac{3}{3 + \frac{20}{50}} = 0.88$$
$$m_o = 10g * 2\% = 0.2g \tag{7}$$
$$m_{left} = m_o * (1 - E) = 0.24g \leq 10g * 5\%$$

11.

$$c = \frac{0.1042 * 41.25 * 10^{-3}/2 * M_{Ca}}{0.1} = 0.86mol/L \tag{8}$$