

Chapter 17 – Problem Set 2

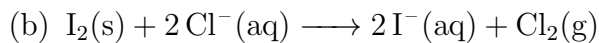
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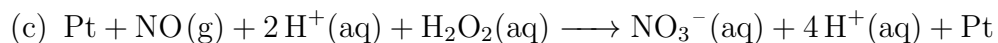
April 22, 2020

- K is the better reducing agent
 - Al is the better reducing agent
 - Co is the better reducing agent
 - Cr is the better reducing agent
- Cl₂ is the better oxidizing agent
 - Au³⁺ is the better oxidizing agent
 - F₂ is the better oxidizing agent
 - Ag⁺ is the better oxidizing agent
- $\text{MnO}_2(\text{s}) + 4\text{H}^+(\text{aq}) + 2\text{I}^-(\text{aq}) \longrightarrow \text{Mn}^{2+}(\text{aq}) + 2\text{H}_2\text{O} + \text{I}_2(\text{s})$

$$\begin{array}{r} 1.229 \\ -0.534 \\ \hline 0.695[\text{V}] \end{array} \quad (1)$$



$$\begin{array}{r} .534 \\ -1.36 \\ \hline -.826[\text{V}] \end{array} \quad (2)$$



$$\begin{array}{r} 1.763 \\ - .964 \\ \hline 0.799[\text{V}] \end{array} \quad (3)$$

4. (a) $2 \text{Cl}^-(\text{aq}) + \text{Br}_2(\text{g}) \longrightarrow \text{Cl}_2(\text{g}) + 2 \text{Br}^-(\text{aq})$ is not spontaneous:

$$\begin{array}{r} 1.077 \\ -1.36 \\ \hline -.283[\text{V}] \end{array} \quad (4)$$

- (b) $\text{Sn}^{4+}(\text{aq}) + \text{Cu}^{2+}(\text{s}) \longrightarrow \text{Sn}^{2+}(\text{aq}) + \text{Cu}(\text{s})$ is not spontaneous:

$$\begin{array}{r} .154 \\ -.339 \\ \hline -.185[\text{V}] \end{array} \quad (5)$$

5. (a) $E^0 = .799 - (-.141) = .94[\text{V}] \Rightarrow -(2)(9.648 \cdot 10^4)(.94) = -181.4[\text{kJ}]$
 (b) $E^0 = 1.229 - (.534) = .695[\text{V}] \Rightarrow -(2)(9.648 \cdot 10^4)(.695) = -134.1[\text{kJ}]$
6. (a) $E^0 = -.547 - (.004) = -.551[\text{V}] \Rightarrow \frac{-.551(2)}{.0257} = -42.88 \Rightarrow e^{-42.88} = 2.39 \cdot 10^{-19}$
 (b) $E^0 = 1.001 - .799 = .202 \Rightarrow \frac{.202(3)}{.0257} = 23.58 \Rightarrow e^{23.58} = 1.74 \cdot 10^{10}$