Review Chapter 17

Michael Brodskiy

Instructor: Mr. Morgan

May 21, 2020

1. (a) Mg is oxidized because the oxidation number goes from 0 to 2, and O is reduced because the oxidation number goes from 0 to -2

   (b) Al is oxidized because the oxidation number goes from 0 to 3, and I is reduced because the oxidation number goes from 0 to -1

2. (a) $Cu^{2+} + 2\,e^- \longrightarrow Cu$

   (b) $Cl_2 + 2\,e^- \longrightarrow 2\,Cl^-$

   (c) $Zn \longrightarrow Zn^{2+} + 2\,e^-$

   (d) $Br_2 + 2\,e^- \longrightarrow 2\,Br^-$

   (e) $Cd \longrightarrow Cd^{2+} + 2\,e^-$

   (f) $I_3{}^- + 2\,e^- \longrightarrow 3\,I^-$

3. (a) $2(Fe^{2+} \longrightarrow Fe^{3+} + e^-) + Sn^{4+} + 2\,e^- \longrightarrow Sn^{2+} = 2\,Fe^{2+} + Sn^{4+} \longrightarrow 2\,Fe^{3+} + Sn^{2+}$

   (b) $Zn \longrightarrow Zn^{2+} + 2\,e^- + Cu^{2+} + 2\,e^- \longrightarrow Cu = Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$

4. (a) $-1.077 + 1.33 = .253[V]$

   (b) $1.077 - 1.36 = -.283[V]$

5. (a) $E^o = .799 + .127 = .926[V] \Rightarrow -(2)(96485)(.926) = -178.7[kJ]$

   (b) $E^o = -.614[V] \Rightarrow -(6)(96485)(-.614) = 355.45[kJ]$

6. $\ln(K) = \frac{n\mathcal{F}E^o}{RT} \Rightarrow E^o = 1.229 - 1.36 = -.131[V] \Rightarrow \frac{(2)(96485)(-.131)}{(8.314)(298)} = -10.2 \Rightarrow K = 3.71 \cdot 10^{-5}$

7. $E = E^o - \frac{RT}{n\mathcal{F}}\ln(Q) \Rightarrow Q = \frac{1.33}{(.0015)^2} = 591111 \Rightarrow E^o = .409 + .799 = 1.208[V] \Rightarrow 1.208 - \frac{(8.314)(298)}{(2)(96485)}\ln(591111) = 1.037[V]$