2008A Standard Reduction Potentials

(use either appendix E or 2008 to solve)

20.35 A voltaic cell that uses the reaction

$$Tl^{3+}(aq) + 2\,Cr^{2+}(aq) \longrightarrow Tl^{+}(aq) + 2\,Cr^{3+}(aq)$$

has a measured standard cell potential of $+1.19$ V. (**a**) Write the two half-cell reactions. (**b**) By using data from Appendix E, determine E°_{red} for the reduction of $Tl^{3+}(aq)$ to $Tl^{+}(aq)$. (**c**) Sketch the voltaic cell, label the anode and cathode, and indicate the direction of electron flow.

20.36 A voltaic cell that uses the reaction

$$PdCl_4{}^{2-}(aq) + Cd(s) \longrightarrow Pd(s) + 4\,Cl^{-}(aq) + Cd^{2+}(aq)$$

has a measured standard cell potential of $+1.03$ V. (**a**) Write the two half-cell reactions. (**b**) By using data from Appendix E, determine E°_{red} for the reaction involving Pd. (**c**) Sketch the voltaic cell, label the anode and cathode, and indicate the direction of electron flow.

20.37 Using standard reduction potentials (Appendix E), calculate the standard emf for each of the following reactions:

(**a**) $Cl_2(g) + 2\,I^{-}(aq) \longrightarrow 2\,Cl^{-}(aq) + I_2(s)$

(**b**) $Ni(s) + 2\,Ce^{4+}(aq) \longrightarrow Ni^{2+}(aq) + 2\,Ce^{3+}(aq)$

(**c**) $Fe(s) + 2\,Fe^{3+}(aq) \longrightarrow 3\,Fe^{2+}(aq)$

(**d**) $2\,NO_3{}^{-}(aq) + 8\,H^{+}(aq) + 3\,Cu(s) \longrightarrow$
$2\,NO(g) + 4\,H_2O(l) + 3\,Cu^{2+}(aq)$