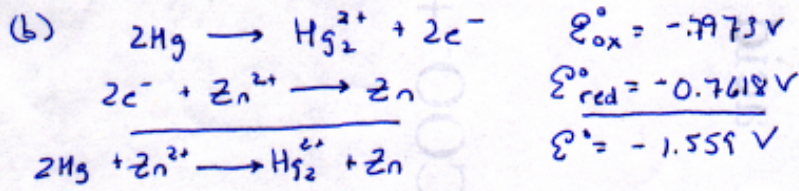


$\Delta G^{\circ} = -nFE^{\circ} = -6 \text{ mole } e^- \times \frac{96485C}{\text{mole } e^-} \times \frac{0.477J}{C} = -2.76 \times 10^5 J$  spontaneous

$K = \exp\left(\frac{-\Delta G^{\circ}}{RT}\right) = \exp\left(\frac{2.76 \times 10^5 J}{8.3145 \times 298}\right) = 2 \times 10^{49}$  effectively complete reaction



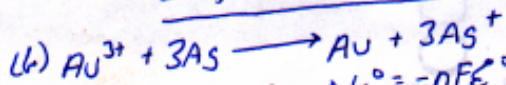
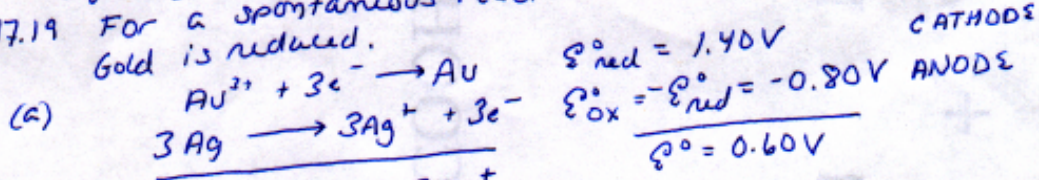
$\Delta G^{\circ} = -nFE^{\circ} = -2 \text{ mole } e^- \times \frac{96485C}{\text{mole } e^-} \times \frac{-1.559J}{C} = 3.0 \times 10^5 J$  not spontaneous

$K = 2 \times 10^{-53}$  effectively 0

~~17.19 For a spontaneous reaction to be spontaneous,  $E^{\circ} > 0$ . The reaction  $3Au + 3Ag^+ \rightarrow 3Au^{3+} + 3Ag$  is not spontaneous because gold is oxidized and silver is reduced.~~



17.19 For a spontaneous reaction  $E^{\circ} > 0$ , silver is oxidized. Gold is reduced.



(c)  $E^{\circ} = 0.60V$   $\Delta G^{\circ} = -nFE^{\circ} = -3 \text{ mole } e^- \times \frac{96485C}{\text{mole } e^-} \times \frac{0.60J}{C} = -1.7 \times 10^5 kJ$  spontaneous

$K = 3 \times 10^{30}$  so effectively complete reaction