

CHM 152
Quiz 10

Spring 2009
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Name Key

- For the Galvanic cell utilizing the following materials,
 - Write the overall cell reaction
 - Calculate E°_{cell}
 - Identify the cathode and anode
 - Calculate ΔG° for the reaction

materials: Ni metal in $\text{Ni}^{2+}_{(\text{aq})}$ Fe metal in $\text{Fe}^{2+}_{(\text{aq})}$

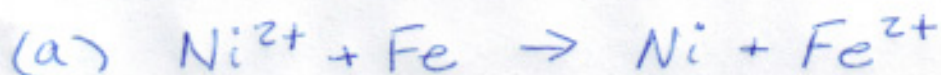
GIVEN: $\text{Ni}^{2+} + 2 e^- \rightarrow \text{Ni}$ $E^\circ = -.23 \text{ V}$

$\text{Fe}^{2+} + 2 e^- \rightarrow \text{Fe}$ $E^\circ = -.44 \text{ V}$

← will reverse

$\Delta G = -nFE_{\text{cell}}$

$F = 96485 \text{ C/mole } e^-$



(b) $-.23 \text{ V} + .44 \text{ V} = +.21 \text{ V}$

(c) cathode = Ni (reduction)
anode = Fe (oxidation)

(d) $\Delta G^\circ = -nFE^\circ_{\text{cell}} = -2 \text{ mole } e^- \left(\frac{96485 \text{ C}}{1 \text{ mole } e^-} \right) (+.21 \text{ V})$
 $= -4.1 \times 10^4 \text{ J} = \boxed{-41 \text{ kJ}}$

BONUS: Write the electron configurations for Fe and Fe^{2+}

