Electrochemistry #5



1. Calculate the electrochemical cell potential for the following reactions and indicate whether the reaction is spontaneous as written.

(a)
$$Co + Fe^{3+} ---> Co^{2+} + Fe^{2+} = 1.05 V$$

(b)
$$H_2 + Cl_2 ---> 2H^+ + 2Cl^ E^o = 1.36 \text{ V}$$

(c)
$$I + MnO_4 --- > I_2 + Mn^{2+}$$
 $E^0 = 0.97 \text{ V}$

- 2. Write a red-ox reaction for Ag metal in Cl₂ gas and determine whether the reaction is spontaneous by calculating the cell potential.
- 3. Will anything happen if an aluminum spoon is used to stir an iron III nitrate solution?

 Explain, using cell potentials.

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- Al + $3 Fe^{3+} \rightarrow Al^{3+} + 3 Fe^{2+}$ Will anything happen if an iron spoon is used to stir an aluminum chloride solution?

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Explain, using cell potentials.

3Fe + 2A13+ -> 3Fe2+ 2A1 E= -1.21 v nothing happens

5. A common test for silver purity is to add a drop of nitric acid. Explain what this test does, using cell potentials.

3A₃ + NO₃ + 4H[†] → 3A₃ + NO₍₃₎ + 2H₂O ∈ +0.16v bubbles of NO 6. Would the nitric acid test for silver purity work for gold? Explain, using cell potentials.

- Au + NO₃⁻, 4H⁺ $\rightarrow Au^{3+}$, NO₄₉⁺ 2140 $E^{o}z 0.54V$ no reading occurs.

 7. Good stainless steel is mostly nickel metal. Can copper II sulphate solution be stored in a stainless steel container? Explain, using cell potentials. The Nickel and Cu²⁺ $Ni + Cu^{2+} \rightarrow Ni^{2+} + Cu = E^{o}z + 0.60V \text{ read}.$
- 8. Will anything happen to the copper plumbing in a house if acidified dichromate solution is poured down the drain? Explain, using cell potentials.