

Problem of the Day 43 CHEM 1252

1. You want to deposit nickel metal from a nickel nitrate solution onto a piece of metal inserted into the $\text{Ni}(\text{NO}_3)_2$ solution. Should you use copper or zinc? *You must justify your answer.*

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2. Answer the following questions using the standard reduction table found in Appendix E of your textbook. *You must justify your answer.*

a) Is H^+ capable of oxidizing $\text{Cu}(\text{s})$ to $\text{Cu}^{2+}(\text{aq})$?

<i>Circle one</i>	<i>Justification</i>
Yes	
No	
	4

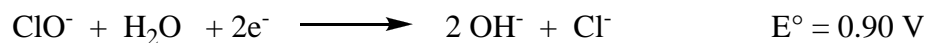
b) Is Fe^{3+} capable of oxidizing $\text{I}^-(\text{aq})$?

<i>Circle one</i>	<i>Justification</i>
Yes	
No	
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c) Is $\text{H}_2(\text{g})$ capable of reducing $\text{Ag}^+(\text{aq})$?

<i>Circle one</i>	<i>Justification</i>
Yes	
No	
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3. Hydrazine (N_2H_4) is a toxic gas. Use the half-reactions below to explain why household bleach (a highly basic solution of sodium hypochlorite, NaClO) should not be mixed with household ammonia or glass cleaners that contain ammonia.



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4. A voltaic cell is composed of the following half-reactions:



a) Calculate E°_{cell} .

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b) Given the following conditions, calculate E_{cell} : $[\text{VO}_2^+] = 2.0 \text{ M}$, $[\text{VO}^{2+}] = 0.010 \text{ M}$, $[\text{Zn}^{2+}] = 0.10 \text{ M}$, $\text{pH} = 1.00$

6

5. A voltaic cell consists of a nickel metal electrode immersed in a solution with $[\text{Ni}^{2+}] = 1.0 \text{ M}$ separated by a porous barrier from an aluminum metal electrode.

a) What is the potential of this cell at 25°C if the aluminum electrode is placed in a solution in which $[\text{Al}^{3+}] = 7.2 \times 10^{-3} \text{ M}$.

6

b) When the aluminum electrode is placed in a certain solution in which $[\text{Al}^{3+}]$ is unknown, the measured cell potential at 25°C is 1.62 V . Calculate $[\text{Al}^{3+}]$ in the unknown solution. (Assume Al is oxidized.)

8