

AP Chemistry – Standard Reduction Potentials – 62

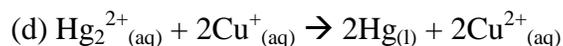
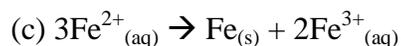
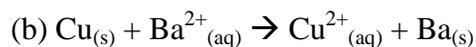
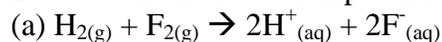
Name _____ Per ____

1. A voltaic cell that uses the reaction $\text{PdCl}_4^{2-}(\text{aq}) + \text{Cd}(\text{s}) \rightarrow \text{Pd}(\text{s}) + 4\text{Cl}^-(\text{aq}) + \text{Cd}^{2+}(\text{aq})$ has a measured standard cell potential of 1.03 V. (a) Write the two half-cell reactions.

(b) Use standard reduction potential data to determine E°_{red} for the reaction involving Pd.

(c) Sketch the voltaic cell, label the anode and cathode, the ions in the solutions, and indicate the direction of the electron flow.

2. Use standard reduction potential data to determine the standard emf for each of the following reactions:



3. Use standard reduction potential data to choose one substance from each pair that is the stronger reducing agent. Indicate why you chose the substance.

(a) $\text{Fe}_{(s)}$ or $\text{Mg}_{(s)}$

(b) $\text{Ca}_{(s)}$ or $\text{Al}_{(s)}$

(c) $\text{H}_{2(g)}$ (acidic solution) or $\text{H}_2\text{S}_{(g)}$

(d) $\text{H}_2\text{SO}_{3(aq)}$ or $\text{H}_2\text{C}_2\text{O}_{4(aq)}$

4. Is each of the following substances likely to serve as an oxidant or a reductant? Explain.

(a) $\text{Na}_{(s)}$

(b) $\text{O}_{3(g)}$

(c) $\text{Ce}^{3+}_{(aq)}$

(d) $\text{Sn}^{2+}_{(aq)}$

5. The standard reduction potential for the reduction of $\text{RuO}_4^-_{(aq)}$ to $\text{RuO}_4^{2-}_{(aq)}$ is +0.59 V. Which of the following substances can oxidize $\text{RuO}_4^{2-}_{(aq)}$ to $\text{RuO}_4^-_{(aq)}$ under standard conditions?

(a) $\text{Cr}_2\text{O}_7^{2-}_{(aq)}$

(b) $\text{ClO}^-_{(aq)}$

(c) $\text{Pb}^{2+}_{(aq)}$

(d) $\text{I}_{2(s)}$

(e) $\text{Ni}^{2+}_{(aq)}$