

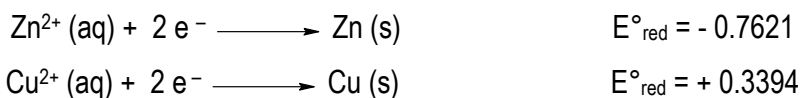
CONCEPT: CELL POTENTIAL: STANDARD

- **Standard Cell Potential** (____): the _____ of the reduction potential (E°_{red}) in *volts* between two half-cells.
 - **Standard** refers to the ions within the half-cells having values of ____ M, ____ atm and pH = ____.
 - **Volts** (____): represents the amount of work done as the electrons travel from one electrode to another in ____.
 - ____ (____) is the SI unit for electric charge.
 - The standard cell potential of an electrochemical cell is calculated by the formula:

Standard Cell Potential Formula

$$E^\circ_{\text{Cell}} = \text{_____} - \text{_____}$$

EXAMPLE: What is E°_{cell} for a voltaic cell based on the following reduction reactions in which the copper electrode is the cathode and the zinc electrode is the anode?

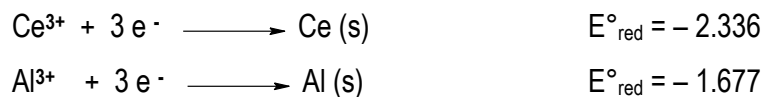


Spontaneity of a Chemical Reaction

- Recall, a standard cell potential value ____ 0 means the reaction is spontaneous.
 - For a galvanic (voltaic) cell, cathode = ____ E° and anode = ____ E° resulting in E°_{cell} ____ 0.
 - For an electrolytic cell, cathode = ____ E° and anode = ____ E° resulting in E°_{cell} ____ 0.

EXAMPLE: Given the following redox reaction: $\text{Ce} (\text{s}) + \text{Al}^{3+} (\text{aq}) \longrightarrow \text{Al} (\text{s}) + \text{Ce}^{3+} (\text{aq})$. Find its standard cell potential when given the following half-reactions.

Standard Reduction Potentials



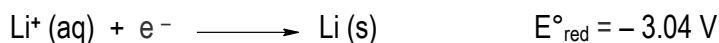
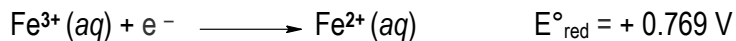
STEP 1: Refer to the redox reaction to determine which species is _____ and which is _____.

- The cathode = _____.
- The anode = _____.

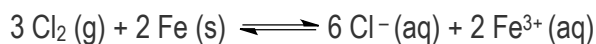
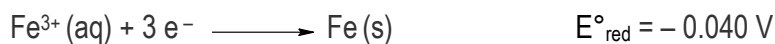
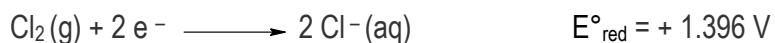
STEP 2: Use the standard cell potential formula to find the final answer.

CONCEPT: CELL POTENTIAL: STANDARD

PRACTICE: Calculate the standard cell potential of an electrolytic cell when given the following half reactions.

Standard Reduction Potentials

PRACTICE: Use the standard half-cell potentials listed below to calculate the standard cell potential for the following reaction occurring in an electrochemical cell at 25°C.

**Standard Reduction Potentials**

PRACTICE: Predict whether the following reaction will occur as written based on the calculated E°_{cell} .

**Standard Reduction Potentials**