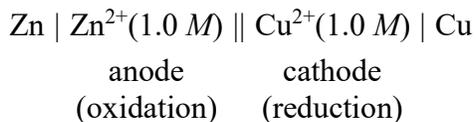


2008B Line Notation For Voltaic Cells

Voltaic cells can be described by a line notation based on the following conventions.

- A single vertical line indicates a change in state or phase.
- Within a half-cell, the reactants are listed before the products.
- Concentrations of aqueous solutions are written in parentheses after the symbol for the ion or molecule.
- A double vertical line is used to indicate the junction between the half-cells.
- The line notation for the anode (oxidation) is written before the line notation for the cathode (reduction).

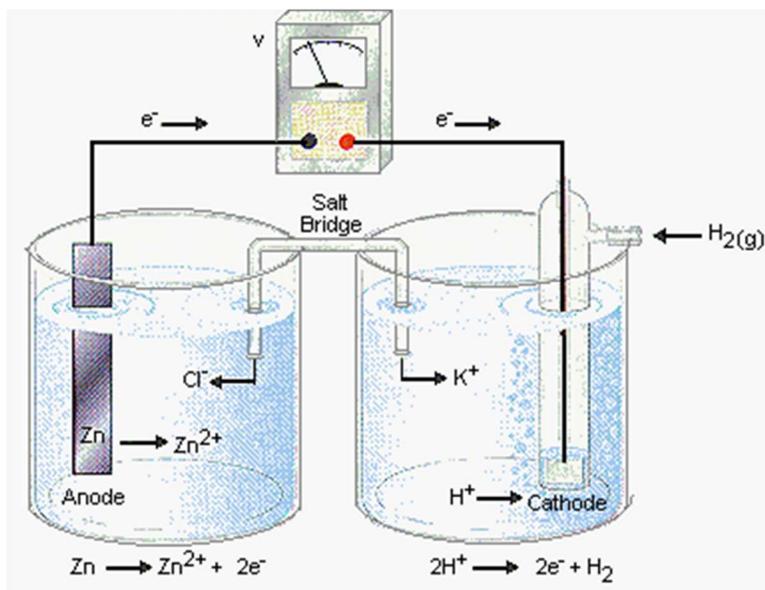
The line notation for a standard-state Daniell cell is written as follows.



Electrons flow from the anode to the cathode in a voltaic cell. (They flow from the electrode at which they are given off to the electrode at which they are consumed.) Reading from left to right, this line notation therefore corresponds to the direction in which electrons flow.

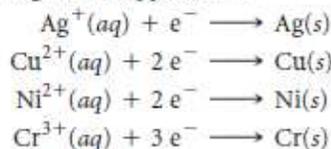
Practice Problem 7:

Write the line notation for the cell shown in the figure below.



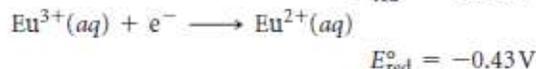
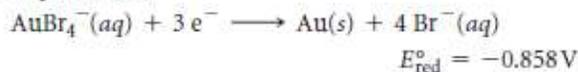
- 1) Complete each of the problems 2) Write LINE Notation for the rxns 3) Diagram (41 & 42)

20.39 The standard reduction potentials of the following half-reactions are given in Appendix E:



(a) Determine which combination of these half-cell reactions leads to the cell reaction with the largest positive cell potential and calculate the value. (b) Determine which combination of these half-cell reactions leads to the cell reaction with the smallest positive cell potential and calculate the value.

20.40 Given the following half-reactions and associated standard reduction potentials:



(a) Write the equation for the combination of these half-cell reactions that leads to the largest positive emf and calculate the value. (b) Write the equation for the combination of half-cell reactions that leads to the smallest positive emf and calculate that value.

20.41 A 1 M solution of $\text{Cu}(\text{NO}_3)_2$ is placed in a beaker with a strip of Cu metal. A 1 M solution of SnSO_4 is placed in a second beaker with a strip of Sn metal. A salt bridge connects the two beakers, and wires to a voltmeter link the two metal electrodes. (a) Which electrode serves as the anode and which as the cathode? (b) Which electrode gains mass and which loses mass as the cell reaction proceeds? (c) Write the equation for the overall cell reaction. (d) What is the emf generated by the cell under standard conditions?

20.42 A voltaic cell consists of a strip of cadmium metal in a solution of $\text{Cd}(\text{NO}_3)_2$ in one beaker, and in the other beaker a platinum electrode is immersed in a NaCl solution, with Cl_2 gas bubbled around the electrode. A salt bridge connects the two beakers. (a) Which electrode serves as the anode and which as the cathode? (b) Does the Cd electrode gain or lose mass as the cell reaction proceeds? (c) Write the equation for the overall cell reaction. (d) What is the emf generated by the cell under standard conditions?