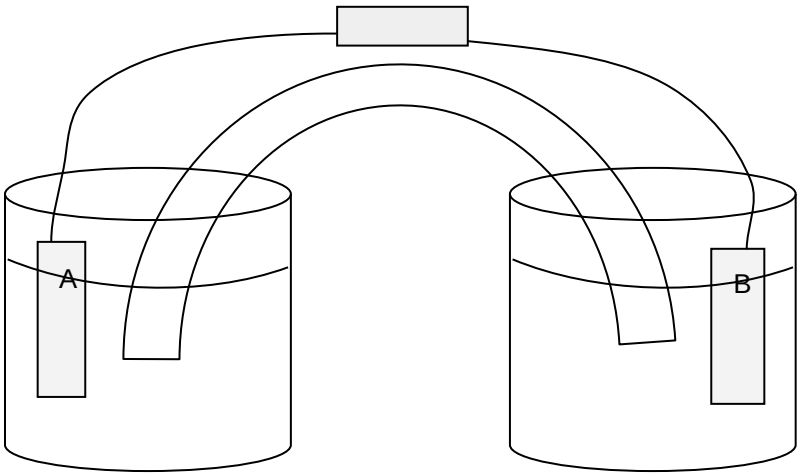
17.3 Assignment
Design an Electrochemical Cell



Design a voltaic cell using magnesium as one of the electrodes. Magnesium can be represented as either Metal A or Metal B in the above drawing. Use metal chlorides as the solutions in the two chambers. For example, magnesium chloride, ($MgCl_2$) will be in solution in the chamber with the magnesium electrode. Use $NaNO_3$ in the salt bridge.

Select another element for the other electrode. Explain why you selected this element. Include information about the activity of the metal you select and the need for a spontaneous reaction.

Metal A:

Metal B:

In the drawing,

1. Label the oxidation compartment:
2. Label the reduction compartment.
3. Label the direction of the flow of electrons.
4. Label the flow of the magnesium ions.
5. Label the flow of your selected element's ions.
6. What is leaving the salt bridge in the anode compartment?
7. What is leaving the salt bridge in the cathode compartment?
8. Write the oxidation and reduction half-reactions.
9. Calculate the chemical potential of your cell. Show all of your work.