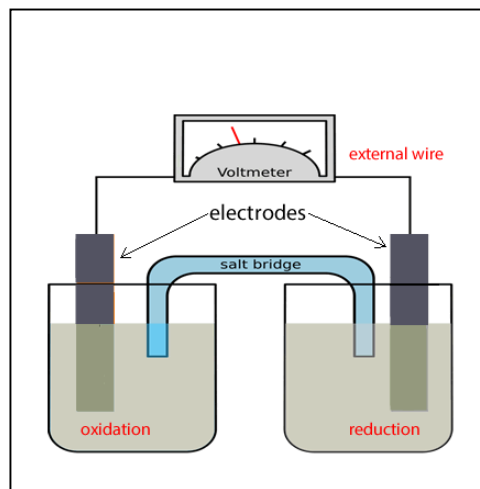


Friday worksheet 4 – constructing a galvanic cell from an overall equation.

A galvanic cell is really a redox reaction that is separated into two half-reactions, the oxidation and reduction, that are separated and connected only by an external wire and a salt bridge. A general image of a galvanic cell is shown on the right.

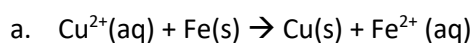
The function of the external wire is to conduct electrons away from the half-cell that oxidation is occurring in to the half-cell where reduction is taking place. The salt bridge on the other hand contains positive and negative ions that move into each half cell to prevent a build-up of charge. Negative ions always flow into the oxidation half-cell while positive ions flow into the reduction half-cell.



1. Consider the following overall equations.

- Separate each into its oxidation and reduction half equations.
- Construct a labelled galvanic cell that can be used to generate electricity from this overall equation.

The first one is done for you.

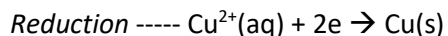
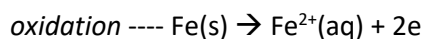


Identify the:

- oxidant  $\text{Cu}^{2+}(\text{aq})$

- reductant  $\text{Fe}(\text{s})$

write the half reactions



Draw the galvanic cell clearly labelling the:

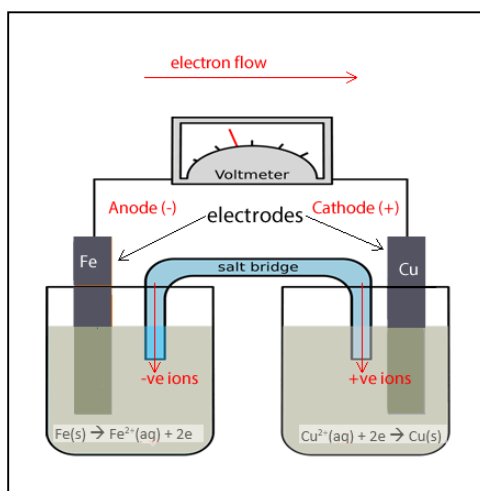
- anode
- cathode
- direction of electron flow
- direction of positive and negative ion flow
- polarity and material of each electrode
- half equation of the reaction taking place in each half-cell.

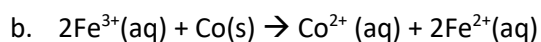
**\* Note – if a metal element exists in the oxidation or reduction half equations in the solid state then electrodes can be constructed from this metal.**

**eg In the oxidation half equation solid iron is present so solid iron metal can be used as the electrode for the anode.  $\text{Fe}(\text{s}) \rightarrow \text{Fe}^{2+}(\text{aq}) + 2\text{e}^-$**

**In the reduction half equation solid copper is present so solid copper metal can be used as the electrode for the cathode.  $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Cu}(\text{s})$**

**If a metal is not present use either carbon or platinum electrodes.**





Identify the:

- oxidant \_\_\_\_\_
- reductant \_\_\_\_\_

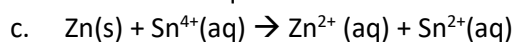
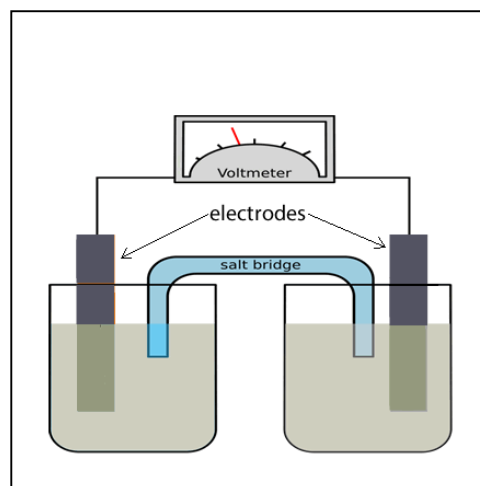
write the half reactions

oxidation ----

Reduction -----

Draw the galvanic cell clearly labelling the:

- anode
- cathode
- direction of electron flow
- direction of positive and negative ion flow
- polarity and material of each electrode
- half equation of the reaction taking place in each half-cell.



Identify the:

- oxidant \_\_\_\_\_
- reductant \_\_\_\_\_

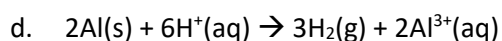
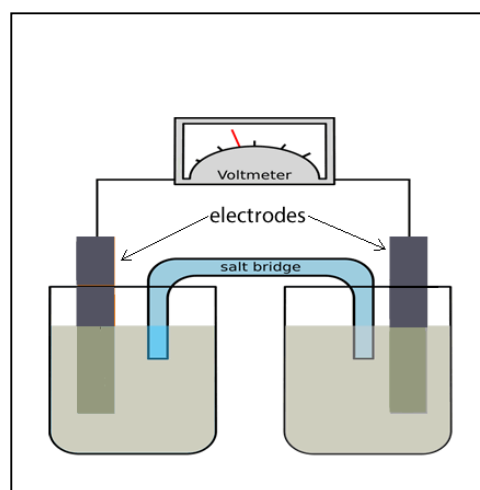
write the half reactions

oxidation ----

Reduction -----

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- anode
- cathode
- direction of electron flow
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Identify the:

- oxidant \_\_\_\_\_
- reductant \_\_\_\_\_

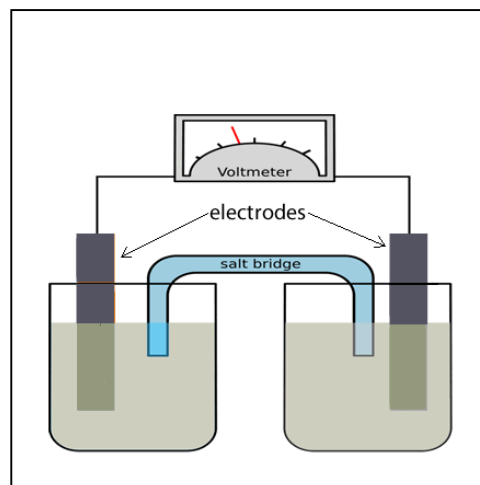
write the half reactions

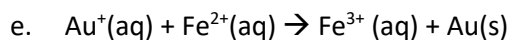
oxidation ----

Reduction -----

Draw the galvanic cell clearly labelling the:

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- cathode
- direction of electron flow
- direction of positive and negative ion flow
- polarity and material of each electrode
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Identify the:

- oxidant \_\_\_\_\_
- reductant \_\_\_\_\_

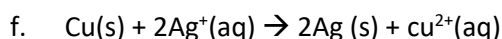
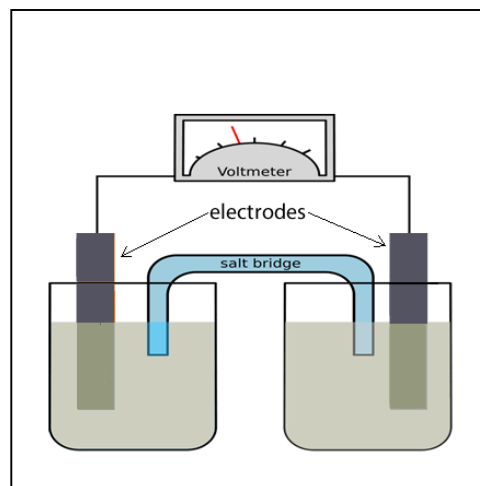
write the half reactions

oxidation ----

Reduction -----

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- anode
- cathode
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Identify the:

- oxidant \_\_\_\_\_
- reductant \_\_\_\_\_

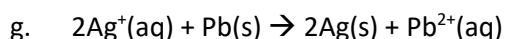
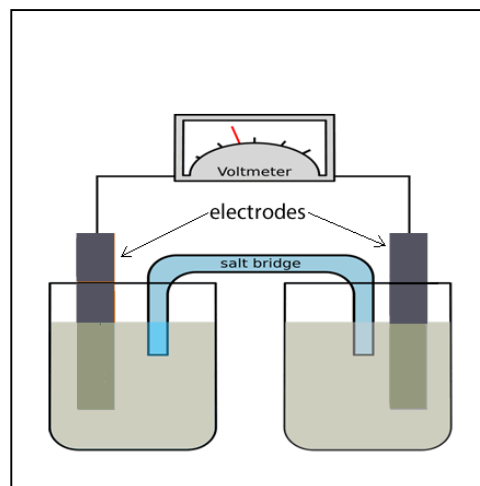
write the half reactions

oxidation ----

Reduction -----

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- anode
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Identify the:

- oxidant \_\_\_\_\_
- reductant \_\_\_\_\_

write the half reactions

oxidation ----

Reduction -----

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