Chemistry 3.7
Redox Chemistry

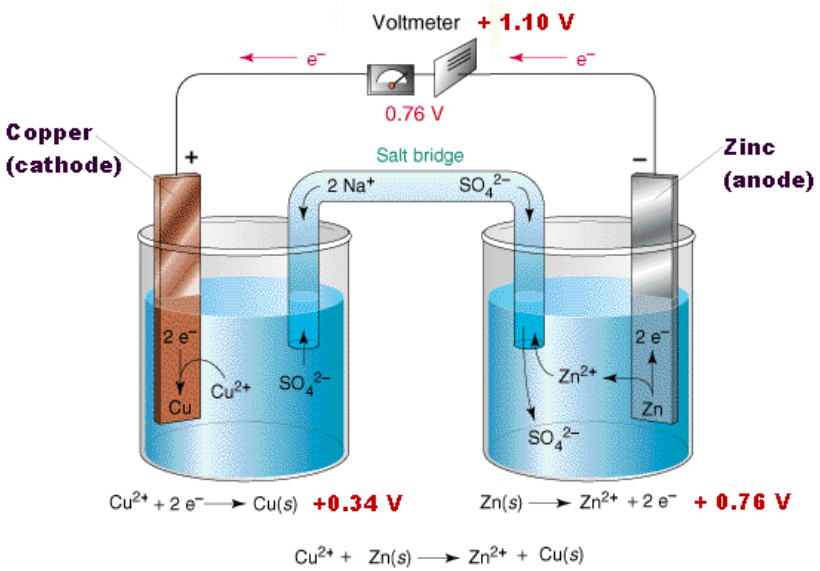
Electrochemical cell

Standard reduction potential E^o

- Measure how the ½ cell behave against SHE
- E^o(oxidant/reductant) = ## V
- The **higher the E^o**
  - the **stronger the oxidant**
  - the **weaker the reductant**
- The **lower the E^o**
  - the **stronger the reductant**
  - the **weaker the oxidant**

Electrochemical cell

- An electrochemical cell is when two ½ cell joined together
- Once it is connected, a redox reaction would occur



Cell diagram

- Instead of drawing beaker all the time, chemist decided to express the cell using a series of symbol
- // represents salt bridge
- / represent change in phase
- , represent different substance in same phase
- And it follows the order of

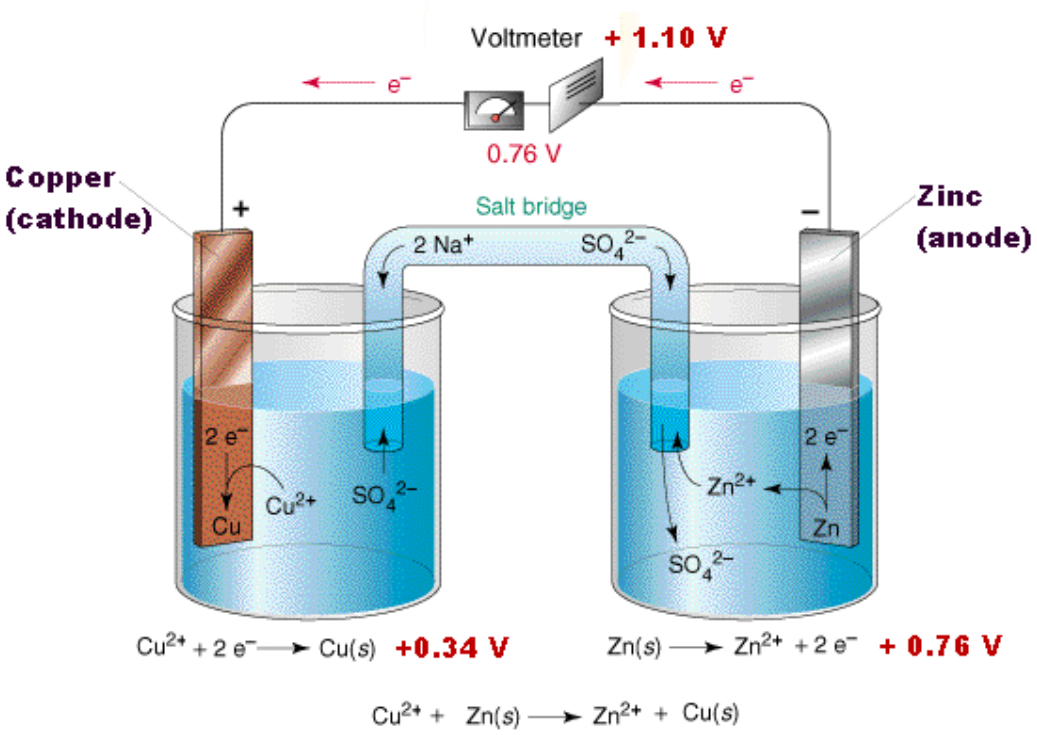
Anode oxidation saltbridge reduction cathode

An Ox Red Cat

- Take the cell on the right as an example
- The “cell diagram” would be

$Zn/Zn^{2+}//Cu^{2+}/Cu$

An/Ox//Red/Cat

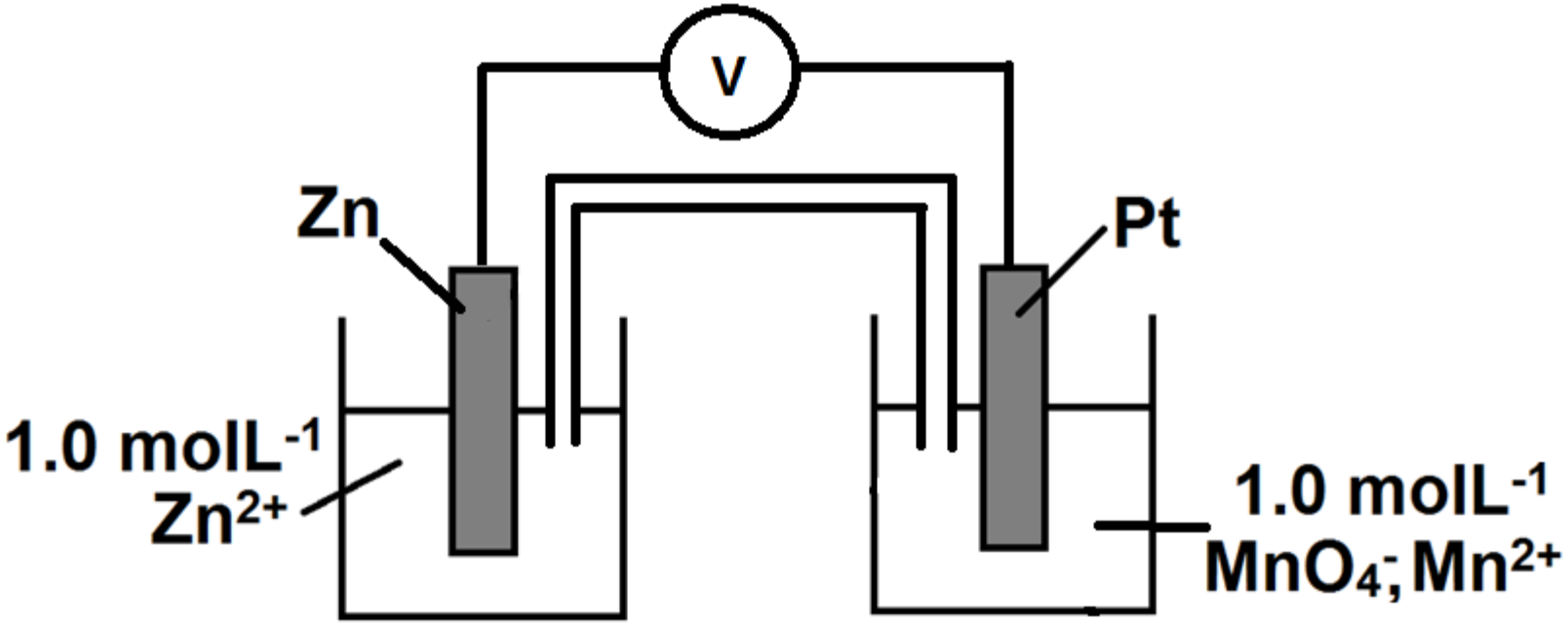


Another example

This time the Cathode is Pt

An/Ox//Red/Cat

$Zn/Zn^{2+}//MnO_4^-,Mn^{2+}/Pt$



Cell potential E^{o}_{Cell}

- Cell potential is the total force which the electrons are travelling
- This is the sum of pulling + the pushing
- E^{o} (standard electrode potential) measures how much the **oxidant pull electrons**
- $-E^{o}$ (the negative value of E^{o}) measures how much the **reductant push electrons**

Therefore the cell potential can be calculated by

$$E^{o}_{cell} = E^{o}_{red} - E^{o}_{ox} \text{ (red-ox)}$$

Positive and Negative E^o_{cell}

- If **E^o is positive**, everything work normal
  - **Cathode** will undergo **reduction**
  - **Anode** will undergo **oxidation**
  - Electron travels from (-) **anode** to (+) **cathode**
- However, if E^o is negative, this would mean
  - Cathode will under go oxidation
  - Anode will undergo reduction
  - Electron travels from cathode to anode
- Another word... **It's all gone horribly wrong**