

Provincial Educational Department – Sabaragamuwa – Weekly School

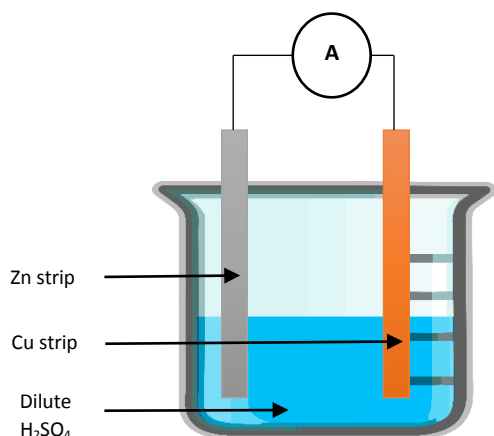
Subject - Science

Week – august 23- 27

Grade - 11

Prepared by – zonal educational office -
kegalle

Let us identify the anode and cathode of an electrochemical cells.



- The electrolyte of this chemical cell is dilute H_2SO_4 .
- Zinc and copper strips acts as electrodes.
- As electrons are released from the zinc atoms, oxidation occurs near the zinc strip.
- So the zinc plate acts as the negative terminal and is called the anode.
- An electron current flows from Zinc to Copper through the external circuit.
- H^+ ions in the solution receive these electrons and form H_2 gas near the Cu strip.
- Because of receiving electrons, reduction occurs near the Cu strip and works as a positive terminal.
- Hence Copper plate is called cathode.

Observations

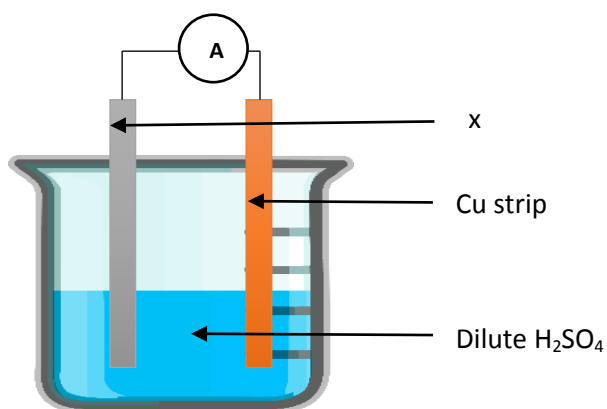
1. Zinc plate is dissolved.
2. H_2 gas bubbles are evolved at the Cu strip.
3. Ammeter pointer is deflected due to the flow of electrons from the Zn strip to the Cu strip.

Anodic reaction – near the Zn strip	$\text{Zn}_{(s)} \longrightarrow \text{Zn}^{2+}_{(aq)} + 2e \dots\dots\dots 1$
Cathodic reaction – near the Cu strip	$2\text{H}^+_{(aq)} + 2e \longrightarrow \text{H}_{2(g)} \dots\dots\dots 2$
1+2 Overall cell reaction	$\text{Zn}_{(s)} + 2\text{H}^+_{(aq)} \longrightarrow \text{Zn}^{2+}_{(aq)} + \text{H}_{2(g)}$

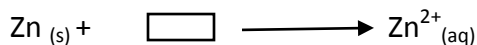
Important

- The metal above the activity series is always the anode. (Negative terminal)
- Oxidation occurs near the anode.
- The metal below the activity series is the cathode. (Positive terminal)
- Reduction occurs near the cathode.

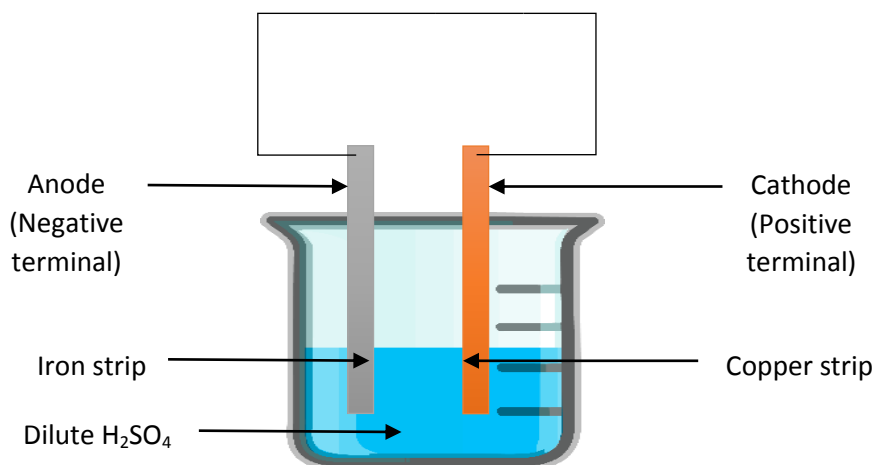
Answer the questions based on this diagram



1. Name X and Y.
2. Name The electrolyte and electrodes in this figure.
3. Select the correct answer
(a) X is a (cathode / Anode)
(b) The process that takes place near the X is (oxidation / reduction)
(c) (O_2 / H_2) gas is liberated near the Cu strip.
(d) X (releases /receives) electrons.
4. Fill in the blanks

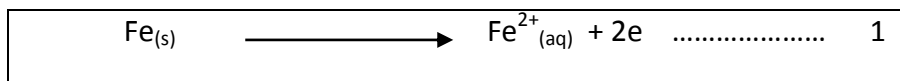


Let's make a cell using iron and copper electrodes



In the activity series iron lies above Cu. Therefore, iron which is the more reactive metal, undergoes oxidation and acts as the anode. (Negative terminal)

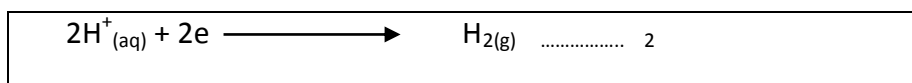
Reaction at the iron strip / anode



The ions in the solution are H^+ and SO_4^{2-} . Electrons from the iron electrode flow to the Cu electrode across the external wire. H^+ ions in the solution receive these electrons and form H_2 gas near the Cu strip. So gas bubbles evolve near the Cu strip.

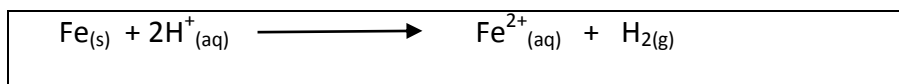
Reduction occurs near the less reactive Cu strip and Cu acts as the cathode (positive terminal).

Reaction at the Cu strip / cathode



The overall ionic reaction of the cell can be obtained by adding these two half reactions.

1+2



When this cell operates, we will be able to see that the iron strip dissolves and gas bubbles evolve at the Cu strip.

Answer the following questions

1. In a cell with iron and Cu electrode
 - (a) Anode (Cu / Fe)
 - (b) Cathode.....(Cu/ Fe)
2. (a) The reaction near the anode is called (oxidation/ reduction)
 (b)The reaction near the cathode is called (oxidation/ reduction)
3. What are the observations that can be seen in the cell?
4. Write the reaction near the cathode.
5. Write the reaction near the anode.