To Set Up Simple Daniell Cell & Determine Its Emf

Theory

When a copper electrode dipped in copper sulphate solution is connected to a zinc electrode dipped in the zinc sulphate solution, then electrons flow from zinc electrode to copper electrode and the chemical reactions take place as:

$$\mathrm{Zn}(s) \longrightarrow \mathrm{Zn}^{2+}(aq) + 2e^-$$

$$\mathrm{Cu}^{2+}(aq) + 2e^- \longrightarrow \mathrm{Cu}(s)$$

$$\textit{Overall reaction}: \mathrm{Zn}(s) + \mathrm{Cu}^{2+}(aq) \longrightarrow \mathrm{Zn}^{2+}(aq) + \mathrm{Cu}(s)$$

Apparatus and Chemicals

One beaker, a porous pot, connecting wires, milli voltmeter, sand paper, zinc strip, copper strip, 1 M $ZnS0_4$solution and 1 M $CuS0_4$ solution.

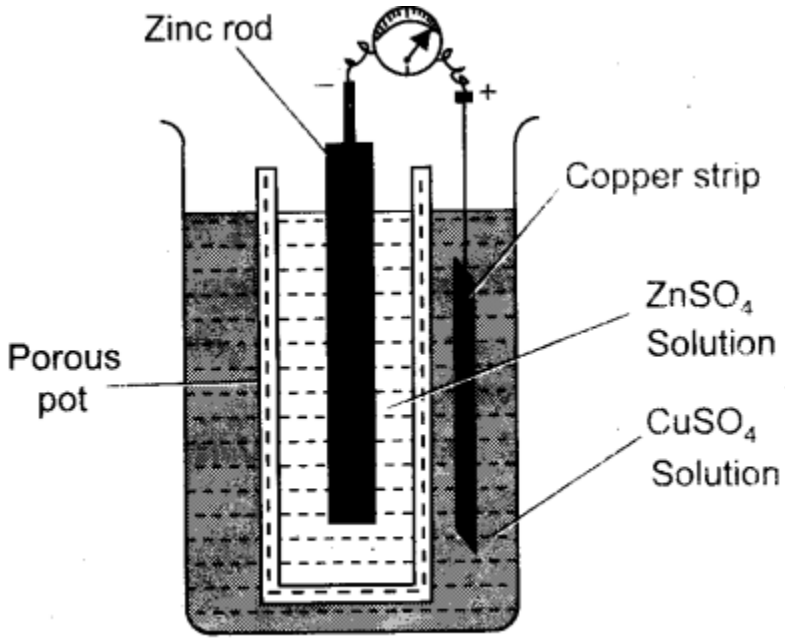

Fig. A Daniell cell.

Procedure

1. Take copper sulphate solution in a clean beaker.
2. Clean the copper strip with the help of sand paper and dip it into copper sulphate solution.

3. Take zinc sulphate solution in a porous pot.
4. Clean the zinc strip with the help of sand paper and dip it into zinc sulphate solution.
5. Keep the porous pot in the beaker.
6. Connect the copper strip with the positive terminal and zinc strip with the negative terminal of a voltmeter as shown in Fig.
7. Note the position of the pointer in the voltmeter and record the reading in your notebook.

Observation

The emf of the Daniell cell is volts.

Precautions

1. The concentration of copper sulphate and zinc sulphate should neither be too low nor too high.
2. The porous pot should not be completely dipped into the copper sulphate solution, i.e., the copper sulphate solution should not be allowed to enter into the porous pot.
3. Clean zinc and copper strips with sand paper before use.
4. Carry out dilution of the solution carefully.
5. Note the reading only when the pointer becomes stable.
6. Connect copper strip with the positive terminal of voltmeter and zinc strip with negative terminal.