(DC1-11) The Lead Accumulator

Aim of experiment

Determination of the strength of electric current that produced from lead accumulator.

Apparatus

D.C Power Supply – Wires – Sulphuric Acid – Two Lead Electrodes – Two Ammeters – Glass Beaker.

Theory of experiment

If two lead electrodes are immersed in sulphuric acid, they become coated with a layer of lead sulphate ($PbSO_4$). When a direct voltage is applied, SO_4^{-2} ions go into solution at the cathode and the electrode surface is again reduced to lead.

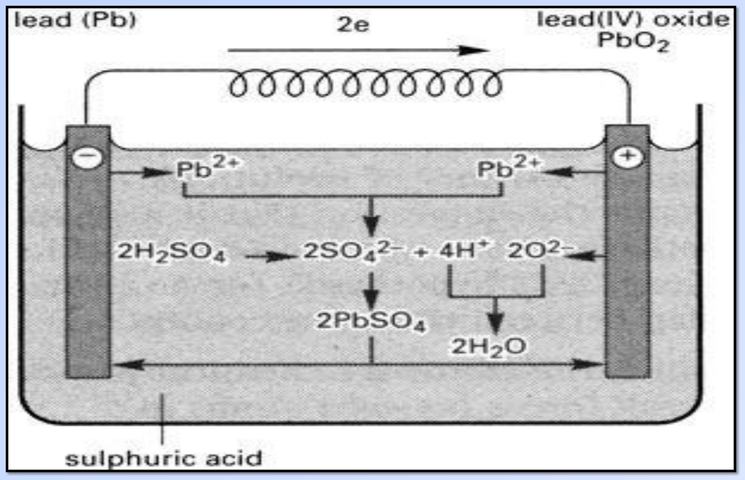

Figure 1. Lead accumulator cell

At the anode, oxygen is combined. The $PbSO_4$ is converted into a black layer, PbO_2. The chemical changes caused at the electrodes by the current are reversible. If the cell is disconnected from the current source and a load is connected to it, the chemical process proceeds in the reverse direction, while the current is produced.

Combined process:

$$\text{Charge} \longrightarrow PbO_2 + Pb + 2H_2SO_4 = 2Pb + SO_4 + 2H_2O \longleftarrow \text{Discharge}$$

Procedure

1. Put about 400 ml of water in a glass tank, and add to it slowly 80 ml of concentric sulphuric acid.
2. Insert the two lead electrodes in the solution, and allow a current of 0.5 A to pass through the solution.
3. After 30 minutes reverse the key and record the current.
4. Repeat the above steps many times at different time intervals and record the current in each case.
5. Calculate the mean value of the current.

Results

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