

Lechlanche Single Fluid Primary Cell Electrolytic Galvanic Voltaic

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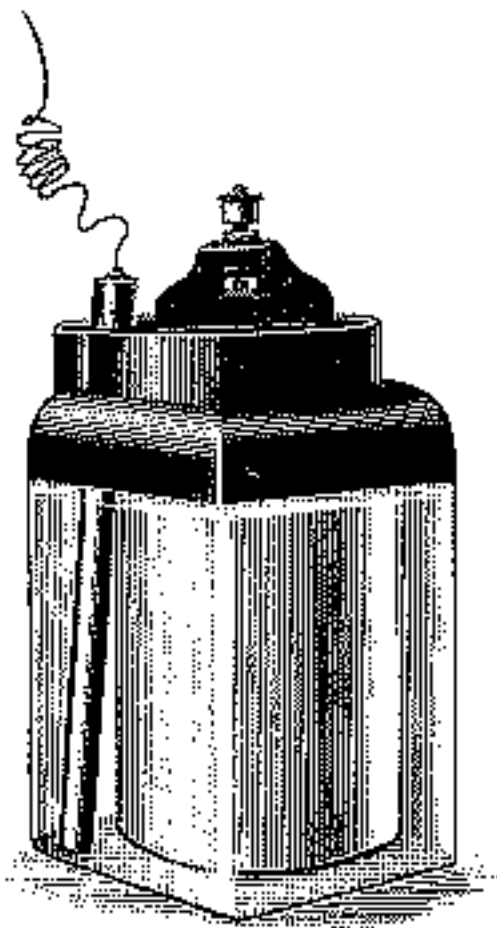


Figure 1. The Leclanché Single Fluid Primary Cell

the glass jar. The electrolyte is strong solution of ammonium chloride (sal ammoniac) NH_4Cl and ZnCl_2 solution.

Like all other primary electrolytic cells, this cell is also generating electricity by chemical action. Chemical action results in the change of substances from their original form to a new substance with new properties. Voltaic cells produce electrical energy by direct conversion that is a result of a redox chemical reaction.

The Leclanché cell has an open circuit voltage of 1.5 Volt. It is able to supply weak current for a long time. Leclanché cells were widely used around the early part of the 1900s for laboratory experiments, railroad, telephone and telegraph signaling and powering small electric motors. Leclanché cell components can be left assembled after use, and the battery is continuously useable.

The **original Volta cell, invented in 1800, made with a diluted acid electrolyte** using sulfuric acid H_2SO_4 . A similar cell was also assembled with an **alkaline electrolyte**, using kalium (potassium in the US) hydroxide KOH electrolyte. None of these cells were practical, because as soon as current was drawn, the polarization effect reduced this current to near zero. During polarization, free hydrogen and oxygen gas collects on the electrodes and polarizes them. The effect of **polarization always opposes the flow of current**. The polarizing gases reduce the electrodes active surface area and after a short while current are no longer able to flow.

In 1866, Georges Leclanché, a French engineer and physicist, modified the Volta cell to prevent the gas to collect on the positive electrode. The **Leclanché cell is a single fluid primary voltaic or galvanic cell - Figure 1**. This cell and its many variants are made of carbon and zinc electrodes. The Leclanché cell is the most successful primary cell in the history of man!

In this cell the cylindrical porous clay pot contains the positive carbon bar that is surrounded by the manganese dioxide MnO_2 and graphite powder C depolarizer mixture. The rod shape negative zinc electrode is located outside the clay pot, within

Many different Leclanché cell variations are known and used. The currently used dry cells are an improved version of the original Leclanché cell. The popular Leclanché cells helped to power the rapid development for the newly emerging postal, rail and transportation sectors between the years of the late 1700s to 1920 and beyond.

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