



19CH201 - ENGINEERING CHEMISTRY

UNIT-2 - ENERGY STORAGE DEVICES

Classifications of battery

Electrochemical batteries are classified into 4 broad categories.

1. A **primary cell or battery** is one that cannot easily be *recharged* after one use, and are discarded following discharge. Most primary cells utilize electrolytes that are contained within absorbent material or a *separator* (i.e. no free or liquid electrolyte), and are thus termed dry cells.

2. A **secondary cell or battery** is one that can be electrically recharged after use to their original pre-discharge condition, by passing current through the circuit in the opposite direction to the current during discharge. The following graphic evidences the recharging process.

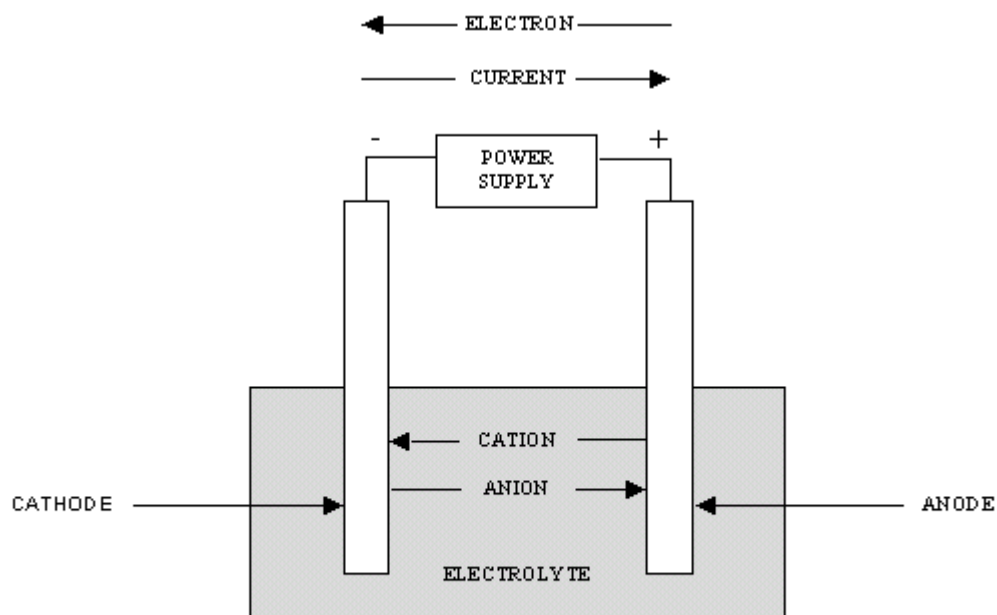


Figure 3: Recharging a Cell



3. A third battery category is commonly referred to as the **reserve cell**. What differentiates the reserve cell from primary and secondary cells is the fact that a key component of the cell is separated from the remaining components, until just prior to activation. The component most often isolated is the electrolyte. This battery structure is commonly observed in thermal batteries, whereby the electrolyte remains inactive in a solid state until the melting point of the electrolyte is reached, allowing for ionic conduction, thus activating the battery. Reserve batteries effectively eliminate the possibility of self-discharge and minimize chemical deterioration. Most reserve batteries are used only once and then discarded. Reserve batteries are used in timing, temperature and pressure sensitive detonation devices in missiles, torpedoes, and other weapon systems.

4. The **fuel cell** represents the fourth category of batteries. Fuel cells are similar to batteries except for the fact that all active materials are not an integral part of the device (as in a battery). In fuel cells, active materials are fed into batteries from an outside source. The fuel cell differs from a battery in that it possesses the capability to produce electrical energy as long as active materials are fed to the electrodes, but stop operating in the absence of such materials. A well-known application of fuel cells has been in cryogenic fuels used in space vehicles. Use of fuel cell technology for terrestrial applications has been slow to develop, although recent advances have generated a revitalized interest in a variety of systems with applications such as utility power, load-leveling, on-site generators and electric vehicles.

