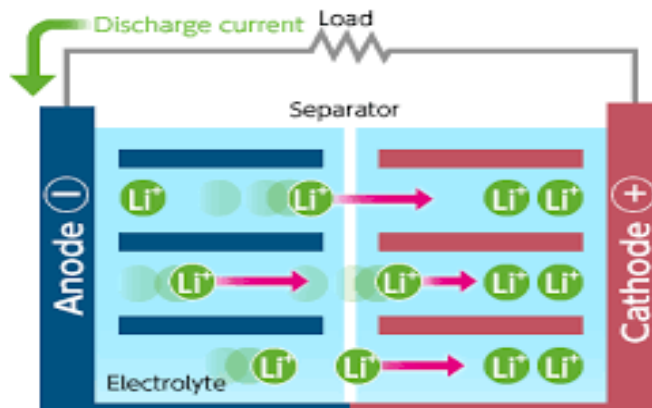




Lithium ion Batteries

- It is a rechargeable type of battery used commonly in portable electronic items including mobile phones, laptop, and electric vehicles.
- The lithium battery consists of a lithium anode and a TiS_2 cathode. A Solid electrolyte is a polymer
- It is important to note that the lithium ion batteries are made of lithium ions and not lithium metal which is highly reactive.



Working:

Lithium ion is a rechargeable battery which is made up of one or more cells and each cell has following essential components namely- an anode, a cathode, a separator, electrolyte and two current collectors a positive and negative. The anode is a elemental lithium which is a source of lithium ion and electrons. The Cathode is a material capable of receiving the lithium and electrons.

At anode : $\text{Li} \rightarrow \text{Li}^+ + \text{e}^-$

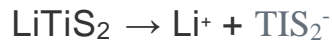
At cathode : $\text{TiS}_2 + \text{e}^- \rightarrow \text{TiS}_2^-$

Overall reaction: $\text{Li} + \text{TiS}_2 \rightleftharpoons \text{Li}^+ + \text{TiS}_2^-$

$\text{Li}^+ + \text{TiS}_2^- \rightarrow \text{LiTiS}_2$

Recharging :

The opposite happens when a device is connected and the lithium ions are released by the cathode and received by the anode; this is precisely how a lithium ion battery works.



Applications of Lithium ion Batteries

Power Backups/ Emergency Power/ UPS: Lithium-ion battery provides instant backup power in case of emergency and allows us to safely shut down or keep the vital equipments running during the emergency situation.

Solar Power Storage Units: Lithium ion batteries are best suitable for storing power at a solar power unit because these batteries charge very quickly,

Advantages

High Energy Density: Energy density allows the battery to provide power for longer duration between charges and also makes it possible to fit in various size types.

High Voltage: LIBs provide a constant voltage of 3.6 volts until discharging, while the other batteries provide 1.5 to 2 volts per cell voltage.

Disadvantages

Requirement of Battery Management System: The LIBs require an incorporated protection circuit to ensure the working of the batteries within safe operating limits. These batteries also require protection from overcharging and being discharged too far.

Cost: Typically a normal LIB manufacturing cost is 40% more than that of a Nickel cadmium battery.