Lithium ion battery full information

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A lithium-ion or Li-ion battery is a type of rechargeable battery that uses the reversible intercalation of Li + ions into electronically conducting solids to store energy.

Lithium-ion batteries power the lives of millions of people each day. From laptops and cell phones to hybrids and electric cars, this technology is growing in popularity due to its light weight, high energy density, and ability to recharge. So how does it work? This animation walks you through the process.

Be it a small power bank or a Laptop or something as big as the Tesla"s new Model 3 everything is being powered by a Lithium-ion battery. What makes these batteries special? What should you know about it before you use one in your projects/designs?

A modern lithium-ion battery consists of two electrodes, typically lithium cobalt oxide (LiCoO 2) cathode and graphite (C 6) anode, separated by a porous separator immersed in a non-aqueous...

So what"s so special about lithium-ion batteries? Their main drawcard is their energy density--it"s around double that of a NiCad battery, meaning that a battery half the size will give the same amount of power. They"re light and compact which means they"re better for things like portable electronics than the heavy lead-acid batteries that start our petrol cars.

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During discharge, the lithium ions are de-intercalated from the anode and travel back through the electrolyte to the cathode. This also releases the electrons that were tying them to the anode, and these flow through an external wire, providing the electric current that we used to do work. It"s the connection of the external wire that enables the reaction to proceed--when the electrons are free to travel, so are the positively charged lithium ions that will balance the movement of their negative charge.

When the cathode becomes full of lithium ions, the reaction stops and the battery is flat. Then we recharge our lithium-ion batteries again, and the external electric charge that we apply pushes the lithium ions back into the anode from the cathode.

Being small and light, a lot of lithium can be stored (intercalated) in both the electrodes. This is what gives lithium-ion batteries their high energy density. For example, one lithium ion can be stored for every six carbon atoms in the graphite, and the more lithium ions there are to share the travelling from the anode to the cathode (and back again during recharge cycles), the more electrons there are to balance out their movement and provide the electric current.

The transfer of lithium ions between the electrodes occurs at a much higher voltage than in other battery types and, as they must be balanced by an equal amount of electrons, a single lithium-ion cell can produce a voltage of 3.6 volts or higher, depending on the cathode materials. A typical alkaline cell produces only around 1.5 volts. A standard lead-acid car battery needs six 2-volt cells stacked together to produce 12 volts.