



# SNS COLLEGE OF TECHNOLOGY

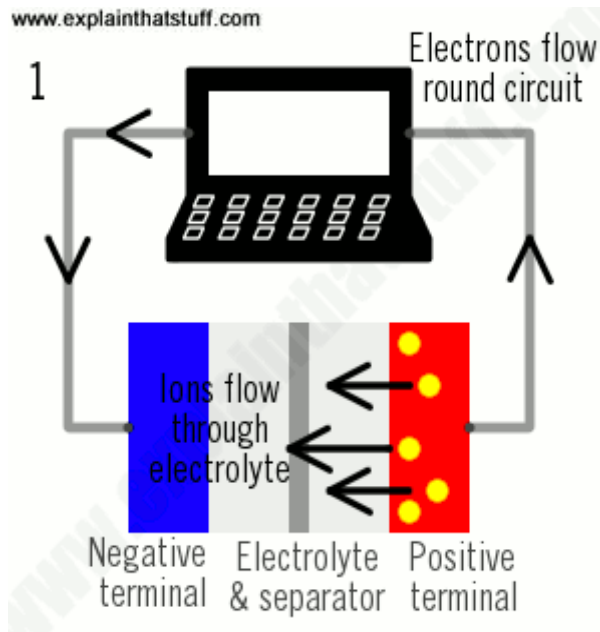
(An Autonomous Institution)



## Lithium Ion Batteries

Like any other battery, a rechargeable lithium-ion battery is made of one or more power-generating compartments called **cells**. Each cell has essentially three components: a **positive electrode** (connected to the battery's positive or + terminal), a **negative electrode** (connected to the negative or – terminal), and a chemical called an **electrolyte** in between them. The positive electrode (Cathode) is typically made from a chemical compound called lithium-cobalt oxide ( $\text{LiCoO}_2$ ) or, in newer batteries, from lithium iron phosphate ( $\text{LiFePO}_4$ ). The negative electrode (Anode) is made from Lithium metal and the electrolyte is Lithium Based gel or Solid polymer which is varied from one type of battery to another

1. During charging, lithium ions (yellow circles) flow from the positive electrode (red) to the negative electrode (blue) through the electrolyte (gray). Electrons also flow from the positive electrode to the negative electrode through the external circuit. The electrons and ions combine at the negative electrode and deposit lithium there.
2. When no more ions will flow, the battery is fully charged and ready to use.
3. During discharging, the Lithium ions flow back through the electrolyte from the negative electrode to the positive electrode. Electrons flow from the negative electrode to the positive electrode through the outer circuit, powering your laptop. When the ions and electrons combine at the positive electrode, lithium is deposited there.
4. When all the ions have moved back, the battery is fully discharged and needs charging up again.



### Advantages

Lithium ion batteries are more reliable than older technologies such as [nickel-cadmium](#)

1. Eco-friendly: **Lithium-ion batteries** contain relatively low levels of toxic heavy metals found in other types of **batteries**, such as lead-acid and nickel-cadmium (Ni-Cd) **batteries**
2. Lightweight and compact and High energy density
3. Low maintenance and Low self-discharge rate

### Disadvantages

**Lithium ion** cells and **batteries** are not as strong as some other rechargeable technologies.

1. Requires protection circuit to maintain voltage and current within safe limits.
2. They require protection from being over charged and discharged too far. In addition to this, they need to have the current maintained within safe limits.