# How do rechargeable batteries work

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Alessandro Volta accidentally created the first battery in 1800. He was trying to prove to a fellow scientist that it was not necessary to use animal tissue to produce an electric current. Volta was successful in winning his debate and then some. The unforeseen invention of the electrochemical cell brought Volta many honors. Yet, he remained a very modest man.

After his passing, Volta"s face appeared on stamps as well as the 10,000 Italian Lire banknote, which left circulation in 2002. Volta"s name lives on as others commemorated his work by naming the volt after him, a unit we use to measure the force of electric currents.

But what is it that Volta discovered that made the battery work? In this article, we"ll dive deep into answering frequently asked questions, including: how do batteries work, what are they made of, what types of batteries are there today, and what problems do we have with batteries?

Batteries are one of those things that the majority of us take for granted. They"re just a regular part of everyday life that, for the most part, go unseen while they store energy and perform their magic. Think flashlights, cell phones, remote controls, hearing aids, car batteries, and even electric cars.

But have you ever stopped to really try and understand how these indispensable products that provide us with portable, instant energy actually work? Batteries are self-contained power packs that store chemical energy and convert it into electrical energy. The process is known as electrochemistry. To explain the process of how batteries work in more depth, let"s get into the details of what batteries are made of.

Let"s look at an example of the two types of cells. When something with a rechargeable battery -- like your cell phone or tablet -- is on the charger, the battery is functioning as an electrolytic cell. However, while you"re using your electronic device, the battery is working as a voltaic cell.

The two different metals (the anode and cathode) are attached to the battery at opposite ends from each other. This allows a chemical reaction to occur between the electrolyte and the metals, allowing more electrons to release through one metal than the other.

A positive charge develops in the metal that receives a more significant amount of electrons. A negative charge then forms on the opposite side. Then, when a wire, or external circuit, connects the two battery ends to each other, the flow of electrons moves through the wire, balancing the electrical charge and producing an electric current.

The final step is to introduce what we call an electrical load. This is anything that needs electricity to operate. Let"s use a flashlight as an example. When you put the batteries into the flashlight and flip the switch on, you

create a circuit. This circuit connects its light bulb to the wire, allowing electrical energy to flow through the wire and the bulb as electrons pass through the battery"s negative end, through the wire, the light bulb, and back to the battery"s positive end.

Engineers will choose whether to use a battery or capacitor for their product based on the circuit design and its function. Sometimes, they go with a combination of the two. However, that doesn"t mean the two are completely interchangeable.

Alternating current (AC) is a flow of electrons that switches directions regularly, many times a second. The majority of our household appliances run on AC power. For example, the majority of our microwaves, coffee pots, dishwashers, televisions, and even our HVAC systems run on alternating current. However, since battery electrons flow only in one direction, batteries generate direct current (DC). Many portable devices, such as flashlights, cell phones, and mp3 players, run on the DC power provided by batteries.

Not all batteries are equal. Different types of batteries are made with other chemicals and work with various chemical reactions. Let"s take a look at seven of the more common types of batteries.

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Web: https://sumthingtasty.co.za/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346