



VII. Mobile Devices Hardware: Batteries

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1. Types of batteries

Modern mobile devices use one of the four types of batteries listed below :

Lithium-Polymer (Li-Poly)

- This is the latest technology for manufacturing mobile rechargeable batteries. They are ultra-light and have up to 40% more capacity than a nickel metal hybrid battery of the same size.
- They do not have a "memory effect" - a phenomenon that occurs when a rechargeable battery is recharged without having used up its previous charge. The thinness of lithium-polymer batteries stems from the fact that they do not need an outer shell.

Lithium-Polymer (Li-Poly)





1. Types of batteries

Lithium-ion batteries (Li-Ion)

- This is the most popular technology for the production of mobile batteries.
- Biggest drawback is that they are relatively expensive, which also explains why they are mostly used in mid-range and high-end mobile devices.
- Lithium-ion batteries are slightly lighter than nickel-metal hybrid batteries, but generally have a longer life than theirs. Sometimes such a battery can be damaged by overcharging.

Lithium-ion (Li-Ion)





1. Types of batteries

Nickel-cadmium batteries (NiCd)

- This is pretty old technology.
- NiCd batteries suffer from the "memory effect", which means that their charge must be completely depleted before they can be recharged.
- In addition, the chemicals used in the production of nickel-cadmium batteries harm the environment, making the disposal of waste products a big problem.

Nickel-cadmium batteries (NiCd)





1. Types of batteries

Nickel-metal hybrid batteries (NiMH)

- ▶ Unlike nickel-cadmium batteries, NiMH batteries do not contain cadmium, which makes their production more environmentally friendly.
- ▶ In addition, these batteries have a higher capacity than nickel-cadmium batteries for the same dimensions and weight.
- ▶ Nickel-metal hybrid batteries suffer from a partial "memory effect", so after every 20 recharges it is a good idea to let the charge run down completely before recharging the battery.

Nickel-metal hybrid batteries (NiMH)





2. Battery specifications

Capacity

- The capacity of a battery is measured in ampere-hours or milliamp-hours and indicates the charge that a battery can store.
- determined by the mass of active material in the composition of this battery. The capacity of a battery indicates the maximum amount of energy that could be extracted from it under certain conditions.
- Over time and with each subsequent recharge, this capacity decreases.



2. Battery specifications

Cells

- Often a battery is also called a "battery pack" because in most cases it contains more than one cell.
- The cells in a lithium-ion battery are cylindrical batteries quite similar to AA batteries.
- If these cells are not cylindrical, but instead are square or rectangular, then they are called prismatic.
- Mobile devices such as smartphones and tablets use a third type of flat lithium-ion battery.



2. Battery specifications

Type of embedding

- Many smartphones and tablets have a built-in battery that cannot be removed or replaced. There are some devices, however, whose battery can be removed and replaced. There is still no consensus on which of the two types of batteries is better.
- The advantages of a built-in battery are: a thinner device body, fewer parts to break and fewer gaps for dust or moisture to enter.



2. Battery specifications

Type of embedding

- The disadvantage is that, in practice, if the battery fails, the entire phone also fails.
- The advantages of a removable battery are easy replacement with a new one, whether the first one is damaged or simply exhausted. In addition, most phones and tablets with such a battery also have a slot for memory cards (but, of course, one is not a condition for the other).