

Li-ion Batteries

The Li-ion batteries in smartphones, tablets, laptops, and even electric vehicles lose a significant amount of capacity after a certain number of charge cycles. These batteries are not like the older nickel-cadmium (Ni-Cd) and nickel-metal hydride (NiMH) batteries.

Li-ion batteries can be charged or topped up at any time.

Apple says you should “charge your Apple lithium-ion battery whenever you want” and adds that there is “no need to let it discharge 100 percent before recharging.”

<https://www.apple.com/batteries/maximizing-performance/>

Charging

All charging is not the same. Charging to 80% takes less toll on the battery. Charging from 80% to 100% causes much more wear and permanently damages the battery’s capacity. You get a much longer life from your battery if you only charge it to 80% capacity. More technical details here [Battery University](#).

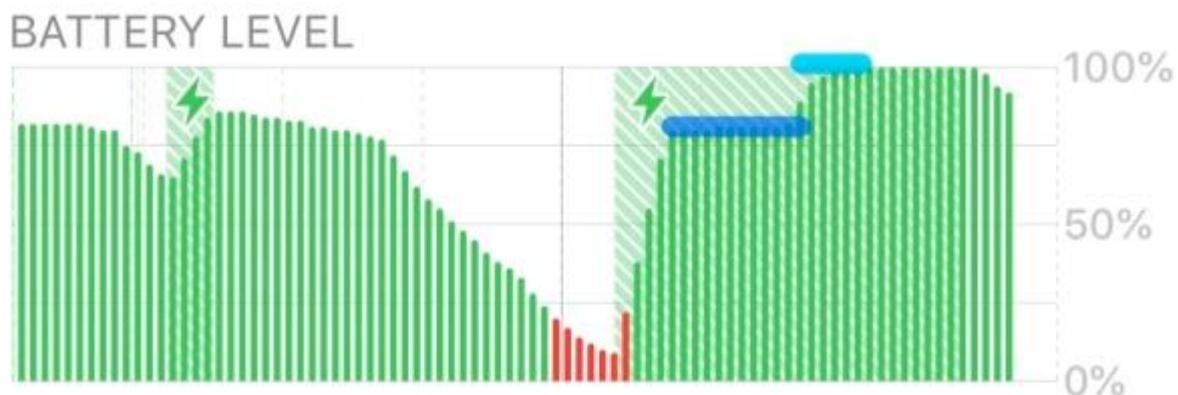
If you have been charging your battery overnight to 100%, your device will start to last for far fewer hours after a year or two. If you look after your battery, you won’t feel you need to buy a new one so soon.

Apple also says to avoid high temperatures. “It’s especially important to avoid exposing your device to ambient temperatures higher than 35° C, which can permanently damage battery capacity. That is, your battery won’t power your device as long on a given charge. Charging the device in high ambient temperatures can damage it further. Software may limit charging above 80% when the recommended battery temperatures are exceeded. Even storing a battery in a hot environment can damage it irreversibly. When using your device in a very cold environment, you may notice a decrease in battery life, but this condition is temporary. Once the battery’s temperature returns to its normal operating range, its performance will return to normal as well”.

Some laptops and tablets have apps that will charge according to a plan that you can set up. Lenovo is one. You need to check for your laptop as different manufacturers have different apps for this.

APPLE IPHONE

Since Apple introduced iOS 13 in 2019, iPhones have included a feature called **Optimized Battery Charging**. This app is intended to charge an iPhone up to 80% at night, while the user keeps the device plugged into a charger. The feature "learns" when the user gets up each morning and long before the user is predicted to wake up, the app automatically charges the battery to 100%.



This image shows an iPhone's battery level across a typical 24-hour day. The user charges the phone for an hour in the middle of the day (indicated by a lightning bolt in the left half of the graph). That evening, when the phone has worn itself down to around 20%, the user plugs it into a charger and goes to sleep. The dark blue horizontal bar is supposed to show when the device is maintained at 80% by the software. The light blue bar shows the battery being charged all the way to 100% capacity.

If you want to charge the battery overnight, leave "Optimised Battery Charging" switched ON. But, to avoid permanent damage to your battery by charging to

100%, go to 'Settings/Battery/Battery Health' and make sure "Optimised Battery Charging" is OFF.



Now be careful to only charge the battery until it reaches 80/85%. Preferably, start charging at not less than 20%.

There are some apps in the Apple App Store that can be set to sound an alarm when your battery reaches 80% of charge.

“Battery Alarm” is one of them-



ANDROID PHONES

On an Android phone, there are apps to manage your battery. For example, you could install the free app Accubattery. There may be a better product, but Accubattery has achieved a rating of 4.6 out of 5 in the Google Play Store.

<https://accubattery.zendesk.com/hc/en-us/articles/210224685-Getting-started-guide>