

# Batteries

## Lithium Ion Voltage vs. Charge Status

[Original Source](#)

4.2V	-	100%
4.1V	-	87%
4.0V	-	75%
3.9V	-	55%
3.8V	-	30%
3.5V	-	0%

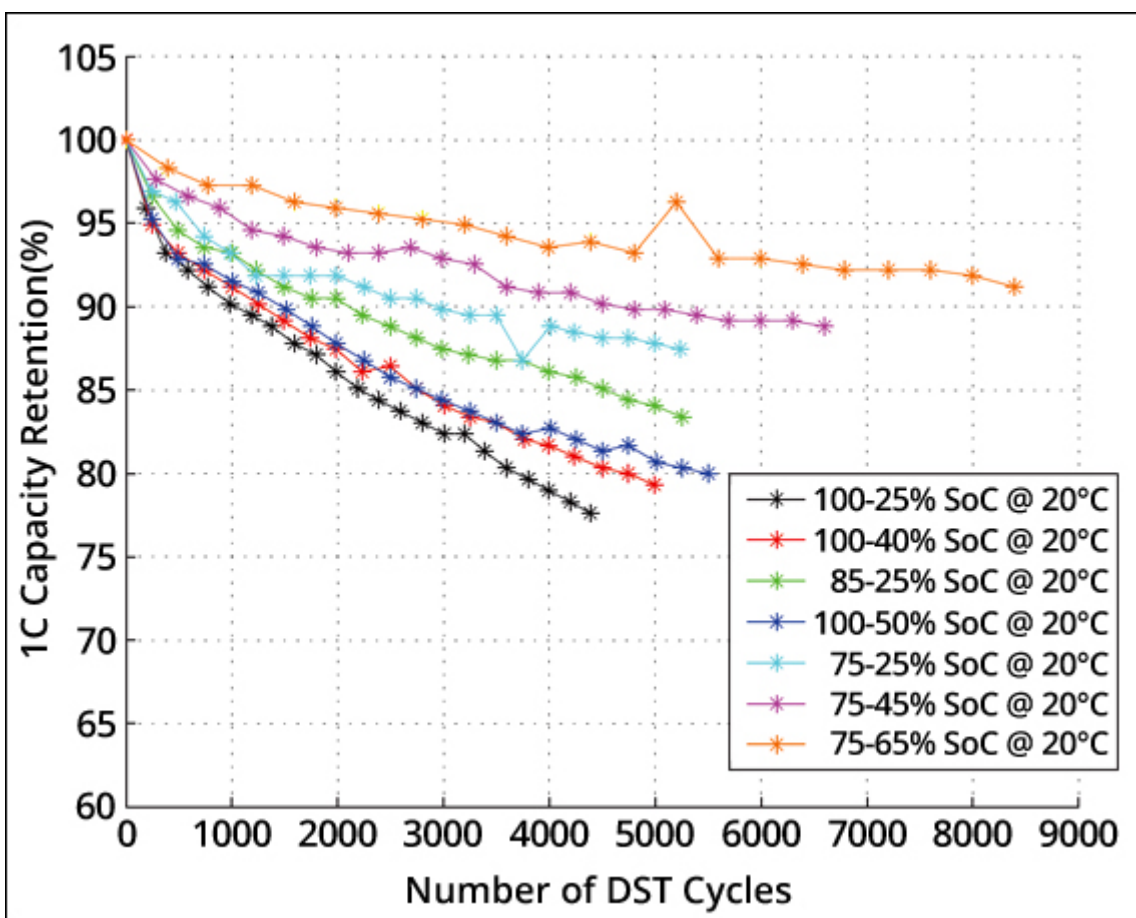
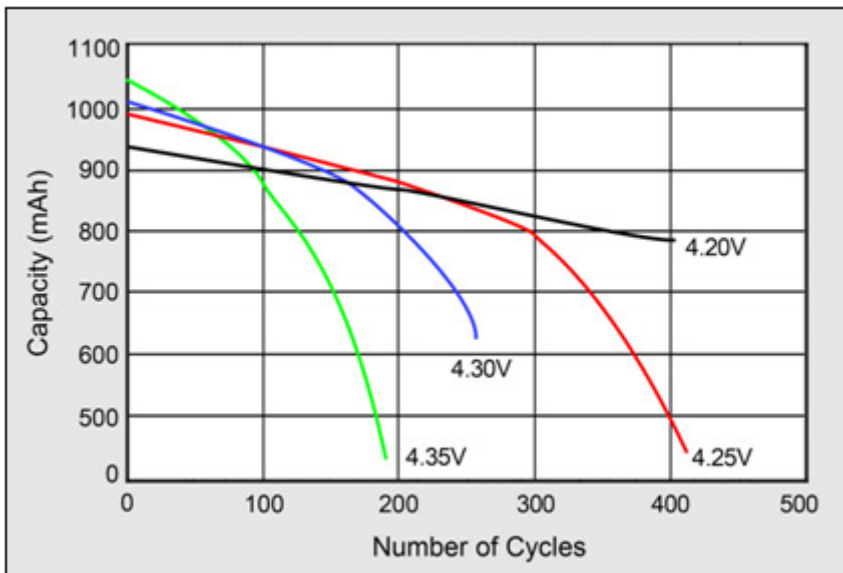
Somewhere in the 3.9V or slightly below area would be ideal for storage. Just don't overdo it. I believe AW batteries generally ship about 40% charge, or you can just discharge them in a light or other device, since that is easy and safe.

## Battery University

Below are links to and summaries of some very informative Battery University articles.

### BU-808: How to Prolong Lithium-based Batteries

[Original Source](#)



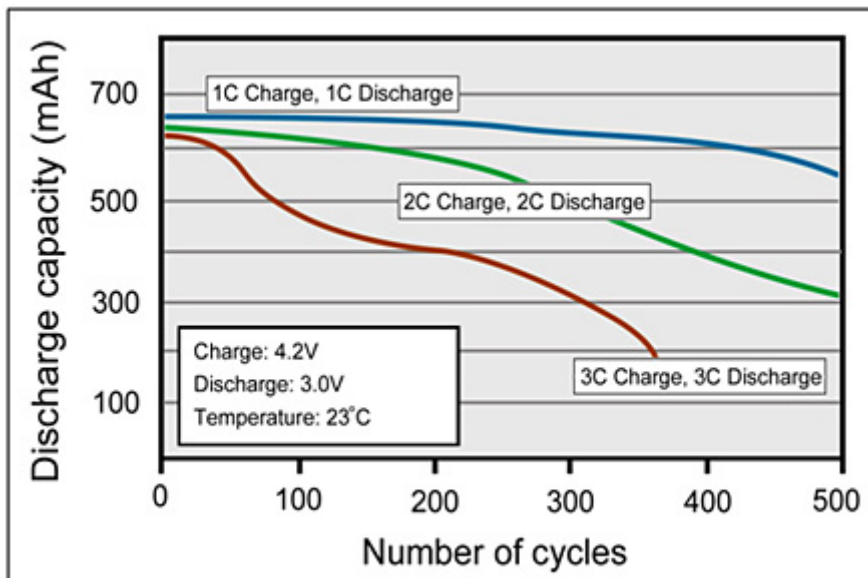
Summary:

- Environmental conditions, not cycling alone, govern the longevity of lithium-ion batteries. The worst situation is keeping a fully charged battery at elevated temperatures. Battery packs do not die suddenly, but the runtime gradually shortens as the capacity fades.
- Lower charge voltages prolong battery life and electric vehicles and satellites take advantage of this. Similar provisions could also be made for consumer devices, but these are seldom offered; planned obsolescence takes care of this.

- A laptop battery could be prolonged by lowering the charge voltage when connected to the AC grid. To make this feature user-friendly, a device should feature a “Long Life” mode that keeps the battery at 4.05V/cell and offers a SoC of about 80 percent. One hour before traveling, the user requests the “Full Capacity” mode to bring the charge to 4.20V/cell.

## BU-401a: Fast and Ultra-fast Chargers

[Original Source](#)



### Summary

- Charging and discharging Li-ion above 1C reduces service life. Use a slower charge and discharge if possible. This rule applies to most batteries.
- All batteries perform best at room temperature and with a moderate charge and discharge. Such a sheltered lifestyle does not always reflect real-world situations where a compact pack must be charged quickly and deliver high currents. Such typical applications are drones and remote control devices for hobbyists. Expect a short cycle life when a small pack must give all it has.

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Revision #2

Created 23 May 2022 01:39:26 by bluecrow76

Updated 23 February 2023 23:36:51 by bluecrow76