

Li ion battery minimum voltage

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I am running one of my projects from two 2000 mAh Lithium Ion cells wired in parallel

I've read in many places that Li-Ions should be 3.7 V when full and 3.2 V when empty, but I've never seen anything about 2.5 V or anything lower than 3 V for that matter. I have heard and seen people talk about "over-draining" a Li-Ion cell, and that when it goes below 3 V a microchip disconnects the battery to protect it from discharging too far.

In this case, my battery still works, and it is charging right now, I don't plan to run it down that low again, but if it were to happen again, is it a big problem? Could this affect the longevity/performance of the cells?

Yes, lithium-ion cells undergo unwanted chemical reactions when discharged below 3 V, causing their internal resistance to be permanently and significantly raised. Their capacity will suffer as well, meaning that they won't accept the same amount of charge anymore. When such an over-discharged cell is "brought back to life", it will likely become chemically unstable, creating a risk of a short circuit developing inside the cell.

Even worse, assuming that you measured 2.5 V at no load, your cells have dropped even lower when they were being discharged and have subsequently rebounded to 2.5 V after the load was removed.

Li-ion cells have a maximum voltage of 4.2 V or less, I am not sure where you got the 4.7 V figure from but it's a recipe for fireworks. OP has since edited the question, to a still incorrect 3.7 V. 3.7 V is the nominal voltage (average voltage during a complete constant current discharge), while 4.2 V is the maximum voltage. These figures will vary slightly from cell to cell.

And that when it goes below 3V a microchip disconnects the battery to protect it from discharging too far.

There is also circuits for multiple cells, and in various variations of externally visible or not. You can purchase the cells with the protection built in or purchase the circuits by themselves. Not just for 18650, all form factors of Lithium cells can have them.

You obviously have a non-protected cell, and because you didn't add a low voltage lockout, drained it beyond the safe limits.

Yes, depleting a rechargeable cell under certain voltage level is harmful to it. The discharge voltage level depends on the cell chemistry.

The minimum discharge voltage varies between various sites, datasheets, etc. but 3.0 V - 2.7 V is an empirical

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value. If discharged under this voltage, the cell may be permanently damaged.

For most modern Li-ion cells, 2.5 V is the discharge limit. Older batteries were usually rated at 2.75 V or 3.0 V, but as I've said, that's not the case in 2020. However, to be completely sure, you do need to consult the cell's manual, as the parameters vary wildly.

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