Battery Charging

Charging and discharging should be monitored in cells to ensure cells last long and perform efficiently. Time taken for charging depends on the method of charging and cell chemistry.

In general slow charging is the best as it does not involve heating of the battery and chargers

Used are simple in construction and working , but slow charging takes very long to complete

Charging. Fast charging requires around 60-120 mins to charge battery upto 80% (60%-80% depending on cell chemistry and other factors), but poses a risk of overcharging , heating, which eventually reduce battery capacity and life. Li ion cells are known to be very sensitive to overcharging , hence a monitoring system is required to monitor SOC and to terminate charging.

There are various types of charging used , each with their own pros and cons , and being better suited to certain cell chemistries than others . Pulsed charging seems to be the best method of charging for Li ion cells as it enables the chemical reaction to keep pace with the rate of input electrical energy and is supposed to reduce unwanted chemical reactions at the electrode surface such as gas formation, passivation etc.

LINKS:

<http://batteryuniversity.com/learn/article/charging_lithium_ion_batteries>

<http://www.mpoweruk.com/chargers.htm#>

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Li-ion charging is mainly carried out in 2 stages:

1.Constant current: The cell is fed constant current ( 0.2C to 1C) until voltage =4.2V ( This takes 40 min at 1C)

2.Constant Voltage: Until SOC goes back up to required amount ( This takes the longest due to exponential decrease in current)

For speeding up the charging, while keeping the cells safe, we could use a switching algorithm that gives small rest intervals for a sub-module while others charge, and then moves onto another sub-module, and so on. This could possibly decrease charging time if done correctly, and also improve battery life and health

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