



Lithium Iron Phosphate High Current Rechargeable Lithium Ion Batteries



Lithium Iron phosphate batteries are safer than Lithium-ion cells, and are available in 10 and 20 AH packs with much longer life.

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Custom design and manufacture of state-of-the-art battery chargers, UPS, and power supplies for OEMs in a hurry!



Large Format Lithium Polymer Cells, 4 AH to 200 AH	Large high-power, high capacity lithium ion cells	Battery management boards for these batteries
	For information on low temperature operation of these big lithium-ion batteries click here. ●	Battery management boards for large lithium ion battery packs

These li-ion cells and batteries not only have high capacity, but can deliver high power. High-power lithium iron phosphate batteries are now a reality. They can be used as storage cells or power sources.

In addition, Lithium Iron Phosphate batteries are among the longest lived batteries ever developed. Test data in the laboratory show up to 2000 charge/discharge cycles.

All of the following products are available by special order. Chargers and battery management boards are available. We are now offering total turn-key solutions for almost any capacity and voltage made of the following building blocks. Delivery is typically 4 weeks.

LiFePO4 Battery Category

Innovation in Li-ion Battery:
LiFePO4 Power Battery, Faster charging and safer performance

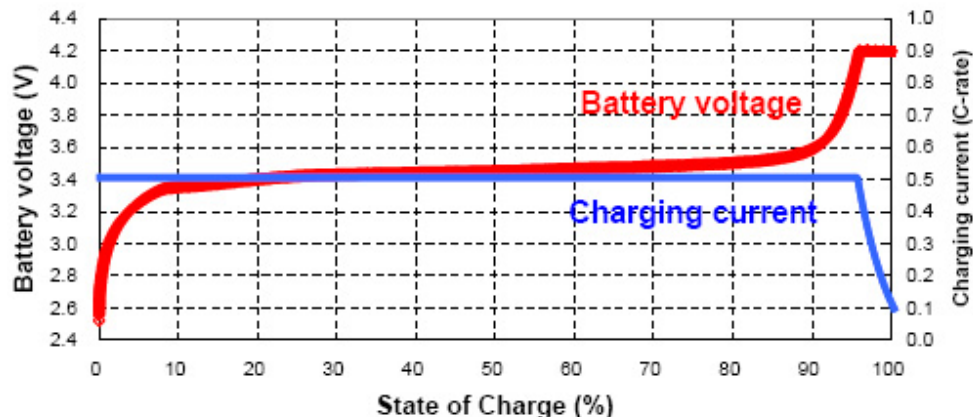
Although small capacity Li-ion (polymer) Battery containing lithium cobalt oxide (LiCoO₂) offers a the best available, lithium cobalt oxide (LiCoO₂) is very expensive and unsafe for large scale Li-ion Batteries.

Recently lithium iron phosphate (LiFePO₄) has been becoming the "best-choice" of materials in commercial Li-ion (and polymer) batteries for large capacity and high power applications, such as laptops, power tools, wheel chairs, e-bikes, e-cars and e-buses.

The LiFePO₄ battery has hybrid characters: it is as safe as the lead-acid battery and as powerful as the lithium ion battery. The advantages of large format Li-ion (and polymer) batteries containing lithium iron phosphate (LiFePO₄) are listed as below:

1. Fast "forced" charging:

During the charging process, a conventional Li-ion Battery containing lithium cobalt oxide (LiCoO₂) needs two steps to be fully charged: step 1 uses constant current (CC) to get 60% State of Charge (SOC); step 2 takes place when charge voltage reaches 4.2V per cell, which is the upper limit of safe charging voltage. Turning from constant current (CC) to constant voltage (CV) means that the charge current is limited by what the battery will accept at that voltage, so the charging current tapers down asymptotically. To put a clock to the process, step 1 (60%SOC) needs a minimum of two hours and the step 2 (40%SOC) needs another two hours. Because an overvoltage can be applied to the LiFePO₄ battery it can be charged by only one step of CC to reach 95%SOC or be charged by CC+CV to get 100%SOC. This is similar to the way lead acid batteries are safely force charged. The minimum total charging time will be about two hours.



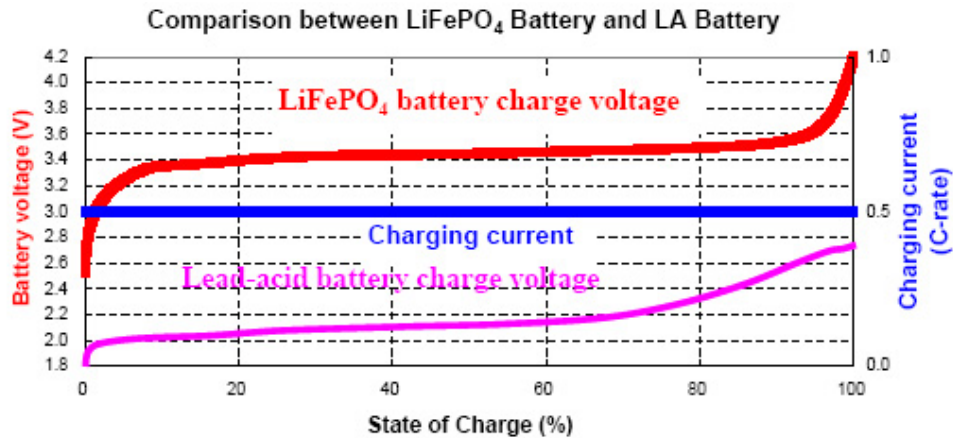
2. Large overcharge tolerance and safer performance

A LiCoO₂ battery has a very narrow overcharge tolerance, about 0.1V over the 4.2V per cell charging voltage plateau, which also the upper limit of the charge voltage. Continuous charging over

4.3V would either damage the battery performance, such as cycle life, or result in fire or explosion.

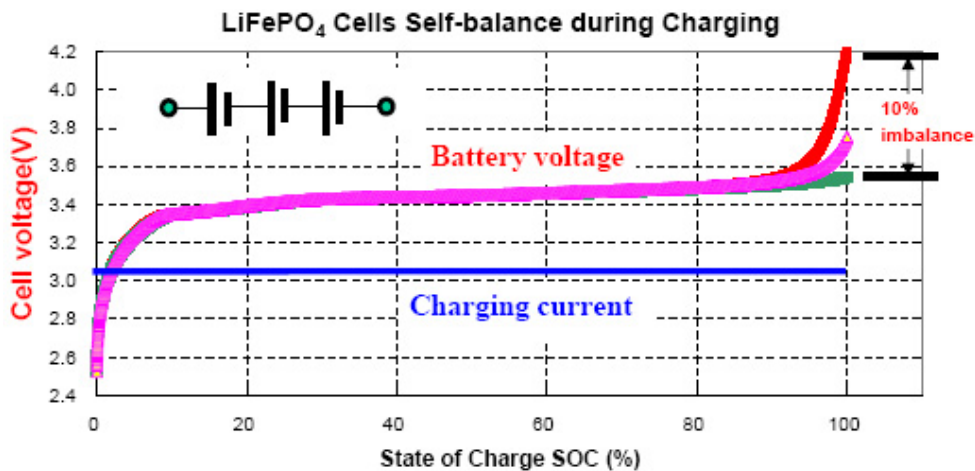
A LiFePO₄ battery has a much wider overcharge tolerance of about 0.7V from its charging voltage plateau of 3.5V per cell. When measured with a differential scanning calorimeter (DSC) the exothermic heat of the chemical reaction with electrolyte after overcharge is only 90 Joules/gram for LiFePO₄ versus 1600 J/g for LiCoO₂. The greater the exothermic heat, the more vigorous the fire or explosion that can happen when the battery is abused.

A LiFePO₄ battery can be safely overcharged up to 30V without protection circuit board. It is therefore suitable for large capacity and high power applications. From the viewpoint of large overcharge tolerance and safety performance, a LiFePO₄ battery is similar to a lead-acid battery.



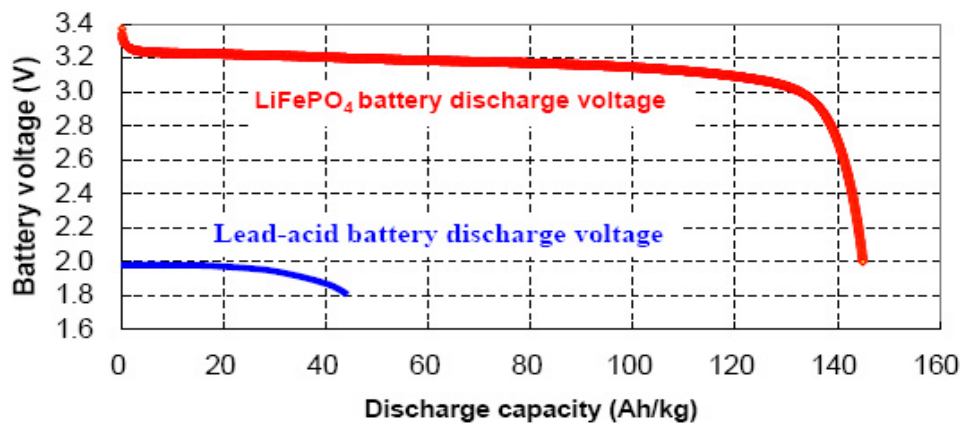
3. Self balance

Like the lead-acid battery, a number of LiFePO₄ cells in a battery pack in series connection can balance each other during charging process. This is due to the large overcharge tolerance of the lithium iron phosphate chemistry. This self balancing characteristic can allow 10% difference between cells for both voltage and capacity inconsistency.



4. Four times higher energy density than Lead-acid battery

Lead-acid battery is an aqueous system. The single cell voltage is nominally 2V during discharge. Lead is a heavy metal, its specific capacity is only 44Ah/kg. In comparison, the lithium iron phosphate (LiFePO₄) cell is a non-aqueous system, having 3.2V as its nominal voltage during discharge. Its specific capacity is more than 145Ah/kg. Therefore, the gravimetric energy density of LiFePO₄ battery is 130Wh/kg, four times higher than that of Lead-acid battery, 35Wh/kg.



5. Simplified battery management system and battery charger

Large overcharge tolerance and self-balance characteristic of LiFePO₄ battery can simplify the battery protection and balance circuit boards, lowering their cost. The one step charging process allows the use of a simpler conventional power supplier to charge LiFePO₄ battery instead of using an expensive professional Li-ion battery charger.

6. Longer cycle life

In comparison with LiCoO₂ battery which has a cycle life of 400 cycles, LiFePO₄ battery extends its cycle life up to 2000 cycles.

7. High temperature performance

It is detrimental to have a LiCoO₂ battery working at elevated temperature, such as 60°C. However, a LiFePO₄ battery runs better at elevated temperature, offering 10% more capacity, due to higher lithium ionic conductivity.

The only forms available right now are the following packs:

Available Battery Packs	Number of cells in series	Capacity (AH)	Nominal Pack Voltage	Maximum Discharge Rate	Dimensions	Weight	Price
PLFP10/36 including battery management board	12	10 AH	36 Volts	15 Amps continuous, 30 amps peak	355 x 107 x 120 mm (14 x 4.2 x 4.7 inches)	4.8 kg (10.6 lbs)	\$625.00 call to order
PLFP20/48 including battery management board	15	20 AH	48 Volts	30 amps continuous, 40 amps peak	560 x 110 x 140 mm (22 x 4.3 x 5.5 inches)	8.5 kg (18.7 lbs)	\$1750.00 call to order
PLF							



Advantages:

- ◆ State of the art lithium-iron-phosphate packs cell with laser welded stainless steel cases, no polymer, rubber, or plastic seals.
- ◆ High Discharge rates
- ◆ Cycle life 1500 to 2000 cycles.
- ◆ Much safer than any other lithium ion technology

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high power lithium battery
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