

Byd blade battery chemistry

BYD India has launched an all-electric MPV e6 for the Indian B2B segment with its 71.7 kWh Blade Battery that claims a WLTC city range of 520 km. BYD's marketing message about its blade battery is that it's the safest battery around. In this write-up, Rahul Bollini discusses some of the features and advantages of this battery.

While undergoing nail penetration tests, the Blade Battery emitted neither smoke nor fire after being penetrated, and its surface temperature reached 30 to 60°C. Under the same conditions, the NMC battery exceeded 500°C and violently burned, and while a conventional LFP block battery did not openly emit flames or smoke, its surface temperature reached dangerous temperatures of 200 to 400°C. This implies that EVs equipped with the Blade Battery would be far less susceptible to catching fire, even when severely damaged.

The Blade Battery also passed other extreme tests, such as being crushed, bent, heated in a furnace to 300°C and overcharged by 260%, without resulting in a fire or explosion. It also completed a strength test that saw it being rolled over by a 46-ton heavy truck which it passed without leakage, deformation or smoke, coming out intact and ready to be used in an EV.

In April 2021, BYD announced that all of its pure electric vehicles would come with the Blade Batteries, with nail penetration testing adopted as a brand standard. The first batch of BYD's sedan HAN EV recently arrived in Brazil, Mexico, Colombia, Uruguay, the Dominican Republic, Costa Rica and the Bahamas. Han EV comes with a range of 605 kilometres and an acceleration of 0 to 100km/h in just 3.9 seconds. e6 launched for India's B2B market is also equipped with the Blade Battery.

A negative chain reaction due to high pressure and high temperature causes thermal runaway in a Lithium-ion cell. Since NMC cells release oxygen as a by-product during thermal runaway, they tend to catch fire very easily. On the other hand, there is no oxygen by-product released in LFP cells during its thermal runaway and hence they don't catch fire.

NMC cells are preferred in EVs because of their higher volumetric density, which allows for higher energy to be stored, enabling a higher range of electric vehicles. BYD blade battery has a higher volumetric energy density compared to regular block type prismatic cells. Hence, the BYD blade battery has enabled the usage of LFP cells in long-range electric vehicles while addressing safety concerns of catching fire during an incident of thermal runaway.

Using a higher number of smaller capacity regular block type prismatic cells create a mechanical disconnect in a battery pack and leads to less efficient utilization of the space. Regular block type prismatic cells have to be packed as a module first and then the modules are assembled into a final battery pack.

