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When we talk about electric vehicle heat, there is no better than the power battery. Ternary lithium battery and lithium iron phosphate battery are the two major directions of mainstream technology. Then, what are their advantages and disadvantages? This article brings us a comprehensive interpretation.

It is well known that the lithium-ion battery consists of cathode material, anode material, diaphragm and electrolyte, of which the cathode material costs up to 30%, and is currently the key to improving battery performance. According to different materials are divided into lithium titanate, lithium cobalt, lithium manganese oxide, nickel cobalt manganese(NCM) and lithium iron phosphate(LFP). NCM battery and LFP battery are the most popular and famous & popular batteries around the world.

Secondly, the low-temperature limit of the NCM battery is -30?, which is more advantageous than the low-temperature limit of -20? of the LFP battery. At the same low-temperature condition, the attenuation of NCM battery in winter is less than 15% obviously better than the LFP battery attenuation up to 30%, more suitable for the northern market, which is why NCM battery sells well in the south, but it is difficult to open the market in the north.

One is high safety performance, because the temperature of the LFP battery thermal runaway is generally above 500?, and the temperature of NCM batteries is below 300?. Some high-nickel batteries even below 200?. Compared with NCM batteries, LFP batteries for vehicle high-speed driving and rapid charging process can highly reduce the spontaneous combustion risk.

The second is longer cycle life. LFP battery charge and discharge cycle number more than 2000 times before it decays,while the NCM battery charge and discharge cycle life is only 500 times, which shows the difference between the two.

The third is that the manufacturing cost is lower. because the LFP battery has no precious metal, so the production cost is lower. On the other hand, the NCM battery is made of cobalt, and 70% of its reserves are in Congo, Africa, which makes its import price skyrocket. The current price has reached $38,000 USD/ ton. LFP battery is more economical sometimes.

Besides their lower energy density, LFPs have been known to suffer from poor charging performance at very low temperatures. Engineers are overcoming that by manipulating thermal regulation through the battery management system, but it does take longer to charge at temperatures below freezing. Keep in mind that the battery pack gets warm as the car is being driven, so the battery temperature is normally higher than the ambient temperature.

Blondal says Nano One is improving the quality and lowering the cost of cathode production for all types of

Li-ion batteries, including LFP. The company’s one-pot process reduces the complexity of making cathode material, produces fewer toxic byproducts, and uses less water and energy. Blondal says that the process is less sensitive to the purity of the raw materials, lowering the cost and reducing the environmental footprint of battery manufacturing.

Another battery company, Advanced Cell Engineering, plans a 2023 release of its Advanced LFP cell in a Very Large Format (VLF) prismatic package, which is designed to be part of the battery’s structure.

Advanced Cell Engineering’s prismatic packaging isn’t the only factor in improving energy density. “Taking a holistic approach, we have re-engineered the full cell chemistry and cell design for LFP cells,” Poor said. “In addition to significant innovation in the anode, every part of the chemistry and formulation has been invented and/or optimized by our technical team. This includes the specific electrode formulations, material specifications, electrolyte chemistry, separator, conductive additives and/or dopants, etc.”

Tesla was one of the first EV makers to switch to LFP batteries. Thanks to a highly efficient powertrain and lightweight design, a Tesla needs less energy to drive the same distance as many other EVs in its class. The company’s standard-range vehicles are now equipped with LFPs, although its high-performance line will still use NMC batteries for the time being. As EV makers continue to trim vehicle weight and improve efficiency, the energy density in a standard LFP will provide plenty of range.

In addition to passenger vehicles, LFPs are often employed in systems where batteries are frequently charged and discharged, such as grid-level and residential energy storage systems, where a little extra weight doesn’t matter. LFPs are also appropriate for buses, fleet vehicles, forklifts, golf carts, boats, and recreational vehicles since they’re depleted and recharged on a daily basis.

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