Lfp prismatic cells

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There have been various standardisation attempts in the Lithium-ion cell industry in terms of cell dimensions. Still, it is difficult to find two chemistries, such as LFP and NMC cells, with similar dimensions (capacities may be different). For example, LFP is popular in 26700, 32700 and 33140cylindrical cell formats, whereas NMC is popular in 18650, 21700, and 26650 formats.

4680 cylindrical was the first attempt to make LFP and NCA cells with the exact same form factor. LFP from BYD (FinDreams battery) cell exhibits 15Ah, and NCA from Panasonic (for Tesla) exhibits close to 26Ah capacity. Another such attempt was made by Volkswagen in the prismatic cell form factor, which we will discuss soon in this article.

Volkswagen PowerCo"s UC (unified cell) is a concept one step ahead, where the three dimensions of the cell will be the same and different chemistries will be used for different scenarios. Similarities in the cell dimensions allow for the following advantages:

80% of the cells would include LFP for lower-range EVs, High Manganese no Cobalt chemistry for mid-range EVs and NMC for high-range EVs. The remaining 20% of the cells would be for specific solutions, which could mean different form factors and chemistry.

The LFP chemistry cells are expected to be charged at a higher voltage, up to 3.8V, to achieve higher capacity and a volumetric energy density above 430Wh/L in prismatic format. This will allow it to come closer to NMC prismatic cells (which are 500-600Wh/L). Traditionally, LFP prismatic cells have much lower than 400Wh/L volumetric energy density.

LMO (Lithium Manganese Oxide) faded from the market due to poor cycle life at high temperatures and manganese dissolution problems. Later, it was relaunched as a composite with NMC. Many companies in the LMO+NMC market are now migrating to other chemistries; it is unlikely that Volkswagen will produce this, given the presence of Cobalt.

Pros – High gravimetric energy density, high volumetric energy density (>50% higher than LFP in Nickel rich NMC) for higher EV range, high-power rating of charge for fast charging and high-power rating of discharge for achieving higher driving speeds and its ability to provide a predictable voltage profile.

The remaining 20% of the cells would be for specific solutions, which could mean different form factors and chemistry. Volkswagen is also eyeing solid-state batteries in collaboration with Quantum Scape, where it aims for less than half charging time and 30% more range.

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