Tesla megapack battery chemistry

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Joe Tegtmeyer described the Telsla 4680 battery chemistry upgrade. At the end of 2023, the 4680 battery chemical composition ratios in Cathode material was NMC 811 (80% Nickel, 10% Lithium, 10% Cobalt). However, Tesla is finishing the process of transitioning over to NMC 955 now that we are in 2024.

They are also trialing asymmetric lamination with one side of the laminated material thicker than the other. The expectation is this will increase the amount of jelly roll that can fit into the 4680 can.

With both of these changes, Tesla will be able to increase the capacity of the 4680 battery initially used in 2023 by a further range of between 10-20%.

Nextbigfuture has a table looking at how the first 4 lines in Texas should ramp and then the other Texas lines, Berlin and Shanghai. This does not factor in a 20% improvements once year in 2024 and 2025 based upon chemistry and battery upgrades. IF Tesla ramps the multiple 4680 lines, then Tesla would be tripling 4680 batteries every 5 months starting January, 2024. Two fully ramped 4680 lines would be 50-60 GWh/year runrate by about May, 2024.

Domestically produced 4680s will be a $6,000 to 13,000 impact in lowering cost or getting inflation reduction act tax credits for each car.

The switchover timing was based on using the last of the older NMC 811 material on hand. The final transition to NMC 955 is now underway.

I believe that since this is essentially just a chemical composition change, the process to upgrade to the newer cells should happen relatively quickly, with little to no drop in production using NMC 955.

Also, as a reminder, the battery cathode plant here at Giga Texas is nearing the end of the initial construction & equipment installation. We may see some initial tests & small-scale production in the first half of 2024. In addition, work continues at the Corpus Christi Lithium Plant, although I suspect it will be the second half of 2024 before it is at a basic operational capability. Eventually, the Lithium Plant & the Battery Cathode Plant will work together to supply Giga Texas 4680 cell production.

Finally, at present, all 4680"s are being directed to Cybertruck, as all Giga Texas Model Y"s are using 2170"s. As the 4680 cell production continues to ramp, this may change, but likely not until late in 2024.

At the end of 2023, the 4680 battery chemical composition ratios in Cathode... pic.twitter /qqF0o1Ic6Q

Brian Wang is a Futurist Thought Leader and a popular Science blogger with 1 million readers per month. His blog Nextbigfuture is ranked #1 Science News Blog. It covers many disruptive technology and trends including Space, Robotics, Artificial Intelligence, Medicine, Anti-aging Biotechnology, and Nanotechnology.

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