

# Electric cars without lithium batteries

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MIT researchers have now designed a battery material that could offer a more sustainable way to power electric cars. The new lithium-ion battery includes a cathode based on organic materials, instead of cobalt or nickel (another metal often used in lithium-ion batteries).

In Australia's Yarra Valley, new battery technology is helping power the country's residential buildings and commercial ventures - without using lithium. These batteries rely on sodium - an...

This EV Battery Tech Could Make Lithium-Ion Obsolete. A new report analyzes patent data for 12 battery types and predicts which is most likely to disrupt the industry with ultra-fast-charging...

That's the question that Focus, a predictive AI analysis platform, aims to answer in its latest report: an analysis of 12 different battery types in development that could potentially replace the current lithium ion batteries in use today. The faster we "recognize winning battery technologies and invest in them, the faster all consumers will get access to these technologies in their daily lives," says Jard van Ingen, founder and CEO of Focus. "This means better, more reliable EVs for all of us."

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Each battery type combines a unique set of materials. For example, the two main types on the road today are nickel cobalt manganese (NCM) and lithium iron phosphate (LFP). NCM batteries have been standard in the US passenger vehicles up until 2023, when LFP batteries started showing up. Tesla, Rivian, Ford, and GM now use them in select base models.

Researchers and automakers are currently exploring many battery types for commercialization. "Each of these chemistries brings something unique to the table, and their development will shape the future of electric mobility," says Focus.

Even though NCM and LFP are the big players in today's existing EV market, both technologies are still evolving at a rapid pace, and are therefore included in the study. For example, newer EVs with both chemistries often have over 300-mile ranges; the Rivian R1T now comes with a 410-mile range option, the most of any EV pickup on the market. With each new vehicle debut, we often see a few minutes shaved off the charge time. Chinese battery company CATL even claims it has an LFP battery that gets 250 miles with just 10 minutes of charging, though it hasn't hit the market yet.

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**Sodium-Ion Batteries:** Made of cheap, abundant materials, sodium-ion batteries are "nipping at the heels of lithium-based batteries," Focus says. This week, the first EVs with sodium-ion batteries rolled off the line in China, Battery News reports.

**Solid-State Lithium:** Solid-state batteries have been in the works for decades, but have not yet come to fruition. If they do, they promise ultra-fast charging and nearly 1,000-mile range, according to Toyota, which plans to mass produce them by 2030. Volkswagen, Honda, Nio, and many others are racing to bring them to market as well.

**Silicon-Anode:** Silicon is an abundant material with great energy-storing potential and similar charging and range promises as solid-state. Porsche and Tesla have both invested in silicon battery companies.

**Lithium-Sulfur:** Though less far along, lithium-sulfur batteries offer "a higher theoretical energy density," Focus says. They are also lighter, so no more ultra-heavy EVs, "but they"re still grappling with issues like short lifespan and poor performance at low temperatures."

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