

THE VERGE

Electric car battery with 600 miles of range? This startup claims to have done it



Electric carmakers have long been clamoring for a battery breakthrough that will improve the range of their vehicles while also extending their lifespans. Innolith, a Swiss startup, says its new high-density lithium-ion batteries can do just that.

The company claims to have made the world's first 1,000 Wh/kg rechargeable battery. (Watt-hours per kilogram is a unit of measurement commonly used to describe the density of energy in batteries.) By comparison, the batteries that Tesla uses in its Model 3 — the so-called 2170 cells — are an estimated 250 Wh/kg; the company plans to eventually push that to 330 Wh/kg. Meanwhile, the US Department of Energy is funding a program to create 500 Wh/kg battery cells. If Innolith's claims turn out to be true, its high-density battery may have just leap-frogged over those targets.

"It's a big jump," Innolith chairman Alan Greenshields said in an interview with The Verge. "It's basically, in rough numbers, four times the current state-of-the-art for lithium-ion... Roughly three times what is generally accepted as being the next improvement in lithium. And it's two times the energy density target [that] organizations like the US Department of Energy have set. So this is a big deal."

A battery with that density would be capable of powering an electric car for 1,000 kilometers (621 miles) on a single charge. That's orders of magnitude better than the current lithium-ion batteries on the market today. Tesla's batteries, which are produced by

Panasonic, can support 330 miles of range in the most expensive models. Most major automakers are aiming for a similar range in their electric vehicles.

Others, like electric car manufacturer Henrik Fisker, are pinning their hopes on solid-state battery technology, which they claim can achieve up to 500 miles of range. Most current electric cars are powered by “wet” lithium-ion batteries, which use liquid electrolytes to move energy around. Solid-state batteries have cells that are made of solid and “dry” conductive material, but that technology is still stuck in the lab and hasn’t made it to production.

Innolith still uses “wet” liquid electrolytes in its lithium-ion batteries, but there’s one major difference: the company replaces the organic (and highly flammable) solvent containing the electrolytes with an inorganic substance that’s more stable and less flammable.

“We take the organic materials out and replace them with inorganic or basically salt-like materials, and that does two things for you,” Greenshields says. “One is it gets rid of your fire risk, so, of course, there’s nothing to burn. And the second part is you’ve also got rid of the most reactive components in the system, which makes it easier to build a battery where you can pack in a lot of energy without the thing becoming unstable.”

The organic materials found in most lithium-ion batteries are the “principle source of side reactions,” which, over time, can consume the active materials in the battery and turn the whole closed-loop system into something “non-productive,” he adds. Innolith claims its new battery has done away with this problem.

Innolith says it will bring its innovative new battery to market via an initial pilot production in Germany, followed by licensing partnerships with major battery and automotive companies. (Greenshields cited India as one country that could be interested in Innolith’s technology.) Development and commercialization will likely take three to five years, which means the company’s battery won’t be ready to go to market until 2022 at the earliest.

A lot can happen between now and then, as Greenshields and Innolith’s CEO Sergey Buchin are well-aware. Previously, the two men were the chief technology officer and chief operating officer, respectively, of Swiss-battery maker Aleva. That company filed for bankruptcy in 2017 after betting big on manufacturing capacity in Charlotte, South Carolina. Even an investment from a Russian billionaire linked to President Trump couldn’t ultimately save the company.

After filing Chapter 11, Greenshields and Buchin arranged the purchase of Aleva’s intellectual property and established a headquarters in Basel, Switzerland. They also bought its research and development facility in Bruchsal, Germany, where they intend to launch their pilot production.

The company isn’t completely theoretical. It’s licensed its battery technology to PJM Grid, which, according to its website, “coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of

Columbia.” PJM has been testing an Innolith “GridBank” battery at scale in Hagerstown, Maryland.

“That’s the first time ever that a rechargeable lithium battery using inorganic electrolytes has been commercially deployed,” Greenshields said. That will hopefully help bolster Innolith’s reputation as it gears up to put its high-energy, high-density battery into production. There have been claims of major breakthroughs in battery technology in the past, but there’s little to show for it. The company’s leaders are aware that they will need to independently verify their claims before anyone lines up to buy their products.

“I think Thomas Edison said the greatest scoundrel was the person who claims they have a battery breakthrough,” said Julian Tanner, Innolith’s chief marketing officer. [Note: I couldn’t find this exact quote, but this 1883 interview with Edison seems to address the broader points about battery breakthroughs.]

Still, Innolith isn’t afraid of appearing like a scoundrel if it means altering the future of battery technology. “We’ve really got a battery breakthrough that will change the landscape forever,” Tanner said.