How to Build a Better Battery

One way we can significantly lower carbon emissions is to get fossil fuel-powered vehicles off the road and replace them with electric vehicles. To do this, we need to develop car batteries that charge quickly, take up less space, and provide cars with the same range as fossil-fuel powered cars. In this video, find out how QuantumScape is developing a battery that could make electric cars more attractive to consumers while reducing carbon emissions at the same time.

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Video clips of car manufacturing and climate impact of cars.

Getting lots of electric vehicles on the road is one way to reduce transportation-related emissions. But to replace all of the existing cars, we need batteries that charge quickly, that take up less space, that cost less, and give cars the same range as their gas powered rivals.

Video clips of the QuantumScape logo and car battery.

QuantumScape has a great battery that is part of the solution to this challenge.

QuantumScape Founder Jagdeep Singh.

There are about a hundred million new cars sold every year. Of those only about 2% are electrified. I bought my first electric car in 2009. It was really fast and clean and green. On the other hand, limitations stemmed from the battery. Got me thinking about what kind of impact you could have if you could build a better battery.

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List of fundamental issues with batteries.

QuantumScape is trying to address the fundamental issues that we think keep today's batteries from enabling mainstream electric vehicles. Those are range, charge time, costs, and then safety. All batteries have three elements to it.

Drawn and animated diagrams of a battery.

There's a cathode, which is the positive electrode. There's an anode, which is the negative side of the battery. And in the middle, there's something called an electrolyte, which is a material that allows ions to flow through it, but not electrons. A conventional lithium ion battery uses a liquid electrolyte. The lithium dissolves in that liquid, drifts through the liquid, and gets to the anode and vice versa during the discharge state.

Animated diagram of a QuantumScape battery and video clips of manufactoring.

In our battery, we replace that liquid material with a solid material. That will then allow you to use a lithium metal anode. And in doing that, you solved two problems in one fell swoop. One is you make it safer, the solid we chose isn't combustible the way a liquid is. And two, is you get a battery roughly double the energy density of conventional batteries, which means that you get twice as many miles.

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Animating comparing battery ranges and video clips of manufactoring.

e-Golfs get a little over a hundred miles of range. Those could go up to maybe 250 miles of range. If today's Teslas get 300 miles of range, those could get over 500 miles of range with what we're doing. And that's why this ends up being kind of the holy grail. When we started the company, we didn't know if we could pull it off, but we told our investors, "Look, this is high risk project, but if we do pull it off, it'll change the world." We've been able to make these cells work and really our main challenge now is to scale up production and get them into actual vehicles. We've partnered with some of the top car companies in the world. Last year, for example, Volkswagen announced that they had tested our cells and seeing great results. They expect to have cars based with a QuantumScape's cell in the market by 2025. We have an opportunity to really transform the world in a fundamental way. Gasoline powered engines are on their way out. They've served their purpose well, but electric cars are better. They're cleaner, they're faster, they're just more fun to drive, and only missing piece really is the battery. Knowing that we're working on that missing piece, it's just very exciting.

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