Future of batteries

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There are many new technologies coming that may make it easier to own and run a zero-emission vehicle. The woes of "range anxiety" and "long charging times" will soon be a thing of the past with battery packs offering over 500 miles of range between charges that only take a few seconds, and power available to you over the air.

We are at the threshold of a battery revolution. Electric car makers know that in order to get an EV in every garage, Americans demand more range and quicker charging. They are well aware of the limitations of the current lithium-ion batteries that power today"s EVs. While computer chips and operating systems continue to advance in saving power, battery packs have been the weak link... until now.

Research at Chalmers University of Technology has been focusing on using new battery tech as a structural component of future electric cars. This could lead to lighter vehicles in which body parts are the batteries. Using carbon fiber as the negative electrode while the positive is a lithium iron phosphate, these batteries would be extremely stiff and rigid for structural components.

NAWA Technologies has designed and patented an Ultra Fast Carbon Electrode that could change batteries as we know them. This utilizes a vertically-aligned carbon nanotube that can boost battery power ten times over current battery packs. It can also increase energy storage by a factor of three and increase the lifecycle of a battery five times over. NAWA says that charging time will be just five minutes to get to an 80 percent charge. This technology could be in production as soon as 2023.

The University of Texas is working on a lithium-ion battery that doesn"t use cobalt as a cathode. Instead, it uses up to 89 percent nickel as well as aluminum and manganese. The motivation is that cobalt is rare, expensive, and harmful to source. The team at U of T say their batteries produce a more elegant distribution of ions as well.

A Chinese company called SVOLT is manufacturing cobalt-free batteries for the EV market. They claim to have a higher energy density, resulting in a vehicle range of up to an estimated 500 miles on a single charge.

Looking for a cure to unstable silicon in lithium-ion batteries, researchers at the University of Eastern Finland have developed a method to produce a hybrid anode that uses mesoporous silicon microparticles and carbon nanotubes. They hope to replace graphite as the anode and replace it with silicon, which has ten times the capacity. The goal is that this will improve battery performance. Best of all, the sourcing of this silicone is earth friendly as it is made from barley husk ash.

IBM Research has discovered a new battery chemistry that is free of heavy metals and can out-perform lithium-ion batteries. The materials are extracted from seawater. IBM says these batteries will be cheaper to make, can charge faster, and pack in higher energy density and power. The company is currently working with

Mercedes-Benz to develop the technology.

Researchers at the University of California Riverside are working on battery technology that uses sand in order to create pure silicon to achieve three times better performance than current graphite-based lithium-ion batteries. This new pure silicon also advances the lifespan of batteries.

Imagine powering your car over Wi-Fi while you drive. You"d never have to recharge your battery by plugging in. While this technology is still a way off, researchers have developed a radio wave harvesting antenna that is only several atoms thick, that may be used to recharge future EVs over electromagnetic waves.

The concept involves incorporating the molybdenum disulphide rectenna so that AC power can be downloaded from Wi-Fi and converted to DC power to recharge a battery or to power an EV directly. Let"s just hope it doesn"t fry your brain at the same time.

Another way to possibly transmit rechargeable power over the air is through ultrasound. A company called uBeam turns power into sound waves that can be beamed to your EV and then turned back into power. Right now, uBeam is experimenting with using this technology to power smartphones and laptops, but who knows where this might lead?

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