Seaweed extract to improve battery performance pdf

Researchers have made a seaweed-derived material to help boost the performance of superconductors, lithium-ion batteries and fuel cells. Seaweed is an abundant algae that grows easily in salt water. While Yang was at Griffith University in Australia, he worked with colleagues at Qingdao University and at Los Alamos National Laboratory in the U.S. to make porous carbon nanofibers from seaweed extract. Chelating, or binding, metal ions such as cobalt to the alginate molecules resulted in nanofibers with an “egg-box” structure, with alginate units enveloping the metal ions. This architecture is key to the material’s stability and controllable synthesis, Yang says. Testing showed that the seaweed-derived material had a large reversible capacity of 625 milliampere hours per gram (mAhg-1), which is considerably more than the 372 mAhg-1 capacity of traditional graphite anodes for lithium-ion batteries. This could help double the range of electric cars if the cathode material is of equal quality. The egg-box fibers also performed as well as commercial platinum-based catalysts used in fuel-cell technologies and with much better long-term stability. They also showed high capacitance as a superconductor material at 197 Farads per gram, which could be applied in zinc-air batteries and supercapacitors. hey have suppressed defects in seaweed-based, lithium-ion battery cathodes that can block the movement of lithium ions and hinder battery performance. And recently, they have developed an approach using red algae-derived carrageenan and iron to make a porous sulfur-doped carbon aerogel with an ultra-high surface area. The structure could be a good candidate to use in lithium-sulfur batteries and supercapacitors. More work is needed to commercialize the seaweed-based materials, however. Yang says currently more than 20,000 tons of alginate precursor can be extracted from seaweed per year for industrial use. Brian Wang is a Futurist Thought Leader and a popular Science blogger with 1 million readers per month. His blog Nextbigfuture.com is ranked #1 Science News Blog. It covers many disruptive technology and trends including Space, Robotics, Artificial Intelligence, Medicine, Anti-aging Biotechnology, and Nanotechnology. Known for identifying cutting edge technologies, he is currently a Co-Founder of a startup and fundraiser for high potential early-stage companies. He is the Head of Research for Allocations for deep technology investments and an Angel Investor at Space Angels. A frequent speaker at corporations, he has been a TEDx speaker, a Singularity University speaker and guest at numerous interviews for radio and podcasts. He is open to public speaking and advising engagements.

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