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Electrochemically Active and Stable Carbon-Nanometallic Hybrids

Inexpensively fabricated cobalt carbon hybrid nanoparticles serve as a high-capacity lithium-ion battery anode, offering excellent cyclic stability and rate performance with scalable synthesis.

Cobalt Oxide (Co_3O_4) is one of the most promising magnetic p-type semiconductors and a capable lithium-ion (Li-ion) anode material due to its high theoretical electrical capacity (890 mAh g). Unfortunately, its use has been hampered by issues related to charging and discharging cycles and low rate performance. Researchers have solved these issues by integrating nanostructures, such as nanotubes, hollow spheres, and hexagonal cages, but the associated price tag make these solutions commercially nonviable.

Researchers at Purdue University have used disordered cobalt carbon nanoparticles as a high capacity anode for rechargeable Li-ion batteries. The cobalt carbon hybrids are inexpensively fabricated using starch and glucose as a carbon precursor. The carbon cobalt hybrids fabricated by this method exhibit excellent rate performance and outstanding cyclic stability compared to previous approaches.

Advantages:

-Less expensive

-Excellent cycling stability

-Scalable synthesis of transition metal carbon hybrid electrodes

-Specific capacity above 1000 mAh/g

Potential Applications:

-Electric vehicles

-Smartphones

-Laptop computers

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Category

Automotive & Mobility
Tech/Battery Management & Charging Technologies
Energy & Power Systems/Energy Storage
Materials Science & Nanotechnology/Nanomaterials & Nanostructures

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