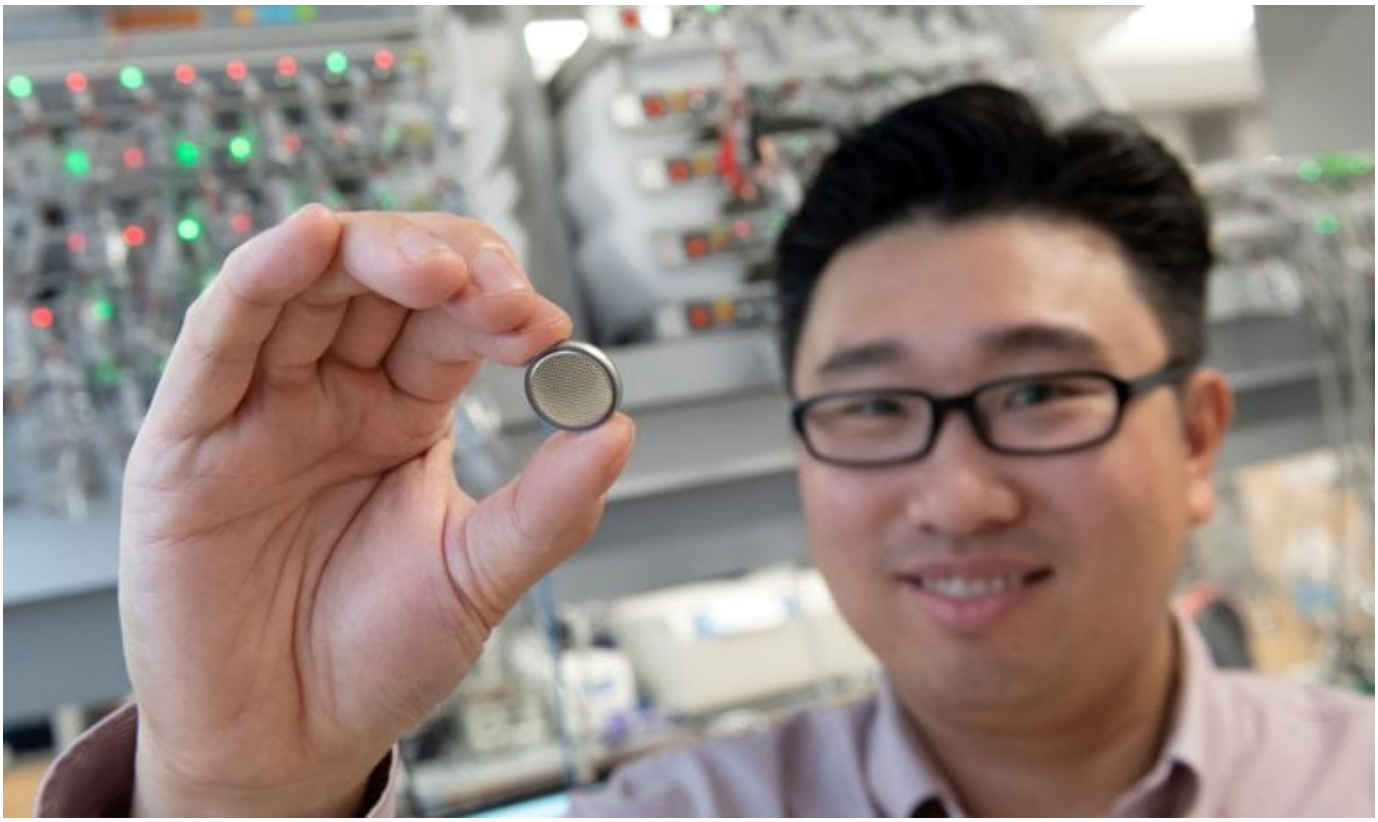
UCI researchers join DOE-funded project to reinvent lithium-ion battery recycling

R&D effort is aimed at improving environmental sustainability and lowering costs
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Brian Bell
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Huolin Xin, UCI professor of physics & astronomy, is a principal investigator in a Department of Energy-funded project to improve methods for recycling and reusing lithium-ion battery materials.

Picture Credit:
Steve Zylius / UCI

The U.S. Department of Energy has granted $10 million to a multidisciplinary team, including researchers at the University of California, Irvine, to devise new methods for recycling end-of-life lithium-ion battery materials. The goal of the research and development project is to reduce the cost of power cell manufacturing, increase performance, reduce chemical waste and minimize geopolitical risks from the acquisition of raw materials.

“Only through the triumph of recycling can we truly address our nation’s dependence on imported lithium, nickel and cobalt, along with the associated supply chain risks they pose,” said UCI principal investigator Huolin Xin, professor of physics & astronomy.

Xin’s role in the effort will be to lead the development of new methods for upgrading recycled cathode powders. “Considering the cathode chemistry, the ratio of nickel, magnesium and cobalt will be adjusted or some new elements will be added, giving the cathode enhanced powers that were not available in the pre-recycled version,” he said.

Studying the transformation of materials at the atomic scale will enable Xin and his team to create novel approaches for making consumer electronics battery materials suitable for use in transportation applications.

While Xin’s group will focus battery elements and composites at the level of atoms, partner institutions, including Argonne National Laboratory, National Renewable Energy Laboratory, Oak Ridge National Laboratory and Princeton Nu Energy Inc., will offer expertise in manufacturing, assembly and disassembly and the safe handling of battery pack materials not related to cathodes and anodes.

Project funding, which originated with the Bipartisan Infrastructure Bill signed into law by President Joe Biden in 2022, will support the construction of advanced factories on U.S. soil to conduct recycling and upcycling operations. UCI and the other participating institutions will contribute $2 million in cost-sharing funds, bringing the total project budget to $12 million.

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