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Wei Lai receives $500,000 NSF CAREER Award for bi-functional battery research

Lithium-ion batteries have dominated the portable electronics market, but their large-scale use in transportation markets could be hindered by the shrinking availability of materials.

Element sodium is 1,000 times more readily available than lithium. A new grant from the National Science Foundation (NSF) to Michigan State University will explore if sodium-based batteries could replace the more popular lithium-ion batteries as a sustainable power source.

Wei Lai, an assistant professor of chemical engineering and materials science in the MSU College of Engineering, has been awarded a five-year $500,000 NSF Faculty Early Career Development (CAREER) Award to work on bi-functional battery materials. NSF CAREER awards support junior faculty who exemplify the role of teacher-scholars through outstanding research and education.

“This CAREER project studies the structure-property relationships of a unique family of bi-functional (as either cathode or anode) sodium electrode materials,” Lai said. “Shedding light on the fundamental mechanisms could enhance materials performance and design, and lead to the discovery of new materials.”
Lai also said the project enables a museum exhibition called, Batteries: Powering the Past, Present, and Future.

“I am hoping to raise awareness and inspire public interest in the science and engineering principles of ubiquitous battery devices in our daily lives.”

Lai becomes the 12th member of the MSU College of Engineering faculty to receive an NSF CAREER Award since 2010.

Lai joined Michigan State in the fall of 2009. His research interests are in ceramics, energy, and electrochemistry.

He earned a bachelor’s degree in materials science and engineering (1998) from the University of Science and Technology in China, a master’s degree (2004) and PhD (2007) in materials science from the California Institute of Technology.

The Faculty Early Career Development (CAREER) Award is among the NSF's most prestigious honors, recognizing young faculty members who are effectively integrating research and teaching.

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