IAOEES
International Academy of Electrochemical Energy Science
Newsletter
Issue 2 June 2015
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Contribution / Advancement / Opportunity

Upcoming Events

Special Column for Members' Highlight

From this issue, IAOEES Newsletter opens a special column for our committee members. In this free platform, they are able to fully introduce the research team to readers in every corner of the world. If you want, please send us any text and picture materials which you think they can demonstrate group's directions, achievements and life.

We provide a stage! You enjoy dancing! People of the world are loyal fans!

Please contact us by email: newsletter@iaoees.org

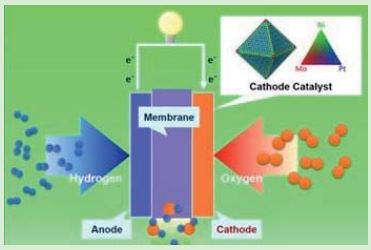
The International Conference on Electrochemical Energy Science and Technology (EEST2015) *will be held in Vancouver, BC, Canada (August 16-22, 2015)*

Research News

Fuel Cells

—Lower-cost, more efficient nanostructures

A team led by researchers at the UCLA has developed fascinating nanostructures made from a compound of three meals, which increases the efficiency and durability of fuel cells while lowering the cost. Their solution addresses vexing problems that have stalled the adoption of this technology. Yu Huang, a UCLA associate professor of materials science and engineering, was the principal investigator of this research. on carrier lifetime and reaction efficiency.



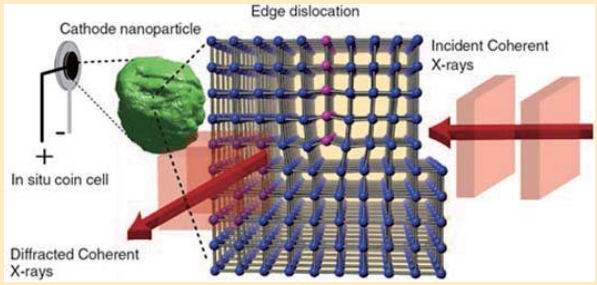
Huang said that "We showed that the addition of a third transition metal enables improvement in both efficiency and durability to bring down long-term costs", "In addition, the surface doping approach may also apply to a broad range of catalysts and opens up a new route for catalyst engineering for the search of high performance catalysts for environment protection, energy generation and chemical productions."

More information*: High-performance transition metal–doped Pt3Ni octahedra for oxygen reduction reaction. Science, DOI: 10.1126/science.aaa8765*

Lithium-ion Batteries

— X-ray imaging reveals secrets of high voltages

Our Researchers report 3D imaging of dislocation dynamics in individual battery cathode nanoparticles under operando conditions using Bragg coherent diffractive imaging. Dislocations are static at room temperature and mobile during charge transport. During the structural phase transformation, the lithium-rich phase nucleates near the dislocation and spreads inhomogeneously. The dislocation field is a local probe of elastic properties, and they find that a region of the material exhibits a negative Poisson's ratio at high voltage. Operando dislocation imaging thus opens a powerful avenue for facilitating improvement and rational design of nanostructured materials.



"It's important to see the defects and know where they are in order to understand how they might change the properties of the material," said Ulvestad, the first author of this paper. "We are the first to do this imaging in a working battery."

More information*: Topological defect dynamics in operando battery nanoparticles, Science, DOI: 10.1126/science.aaa1313*

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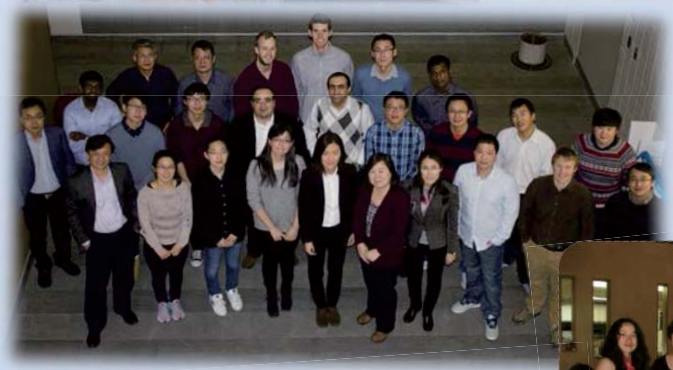
Highlight Members

Professor Xueliang (Andy) Sun *joined the University of Western Ontario (UWO) of Canada in 2004 and founded the "Nanomaterials and Energy Group". He is currently Tier 1 Senior Canada Research Chair in Nanostructured Materials for Energy Storage and Conversion and the Vice-chairman of the International Academy of Electrochemical Energy Science (IAOEES).*



Dr. Sun has dedicated himself to the exploration of novel nanomaterials for use in fuel cells, Li-ion batteries, and next generation Li-S, Li-Air, Na-ion and Na-Air batteries. He has published over 220 papers in peer-reviewed journals with over 6700 citations, featuring high impact journals such as Nature Comm., J. Am. Chem. Soc., Adv. Mater., Angew. Chem. Int. Ed., Adv. Function. Mater., Adv. Energy Mater., and Energy Environ. Sci.. He has also contributed to 15 books/chapters and licensed 11 US patents. Dr. Sun's research group is also a world leader in the development of atomic layer deposition (ALD) technique for use in fuel cells and batteries.

Dr. Sun has also been working on synchrotron radiation, in collaboration with Dr. T.-K. Sham from the department of chemistry at UWO and scientists at the Canadian Light Source (CLS) and the Advanced Light Source (ALS), to unravel the behavior of materials in fuel cells and batteries. Dr. Sun has also actively collaborated with industry partners such as General Motors, Ballard Power Systems, and Johnson Matthey Battery Materials LTD (former Phostech Lithium Inc.) to bridge the gap between lab based research and commercially viable industrial products. He has been awarded over $12 million funding support from these companies and the Canadian government. He has received awards such as Early Researcher Awards (ERA) in 2006, Canada Research Chair Tier II in 2007, Faculty Scholar Award in 2010, Western Engineering Prize for Achievement in Research in 2013 and Canada Research Chair Tier I in 2013.