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Exploration of High Energy Density Battery Materials

By

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Abstract

The fundamentals of rechargeable lithium ion batteries (LIBs) based on layered transition metal oxide (LiCoO_2) were defined by Prof. Goodenough JB in 1970s which was successfully commercialized by Sony Company in 1990s. LIBs have played critical role in the wide applications of portable electronics like cell phones, notebooks, camera, etc. But in recent years the low energy density of LIBs has largely hindered the evolution of consumable electronics with requirements of even thinner and lighter. Particularly the urgent implementation of electric vehicles has been exerting great pressure on developing battery electrode materials with high energy density. In this talk, I will briefly introduce some generally considered battery technologies based on novel electrode materials possessing high energy density. And then efforts of our lab in exploring high energy density battery materials will be summarized and

discussed with focus on lithium ion batteries based on Li-rich layered structured metal oxides and metal fluoride cathodes, and lithium air batteries based on high performance electrocatalysts and O₂ selective mixed matrix membrane for air electrode.

Biography

Prof. Zhouguang LU is now Associate Professor in the Department of Materials Science and Engineering, South University of Science and Technology of China. He obtained his BS and MS from the Central South University in 2001 and 2004, respectively, and PhD from City University of Hong Kong in 2009. He is the recipient of Fulbright Scholarship of USA Government in 2008-2009 and The Overseas High-Caliber Personnel (Level B) of Shenzhen Government in 2013. His research mainly covers the design and synthesis of nanostructures and their application in energy storage and conversion with focus on lithium/sodium ion batteries, lithium-air batteries, and supercapacitors. He has authored for more than 80 peer-review journal papers with total citations of more than 1800 and h-index of 25.

All are Welcome!