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Recent progress in bifunctional catalysts for rechargeable Li-air batteries

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Among various metal/air batteries, lithium-air batteries possess the highest theoretical gravimetric energy density. However, for the rechargeable Li-air battery, besides the challenges of cost, another issue that has to be addressed in the current technology is the limitations of oxygen reduction reaction (ORR) during discharging process and oxygen evolution reaction (OER) during charging process. The sluggish kinetics of the ORR and OER in Li-air batteries is ascribed to the low efficiency of catalysts. Therefore, the design of a low-cost and stable bifunctional electrocatalyst is a major challenge to the construction of efficient Li-air batteries. Several nanocomposite bifunctional catalysts with low cost have been developed in our lab and studied for lithium-air battery applications. They show enhanced catalytic activity and better long-term durability than the commercial Pt/C catalyst.

Biography

Chunwen Sun is a Professor at Beijing Institute of Nanoenergy and Nanosystems (BINN), Chinese Academy of Sciences (CAS). He received his PhD degree in Condensed Matter Physics from the Institute of Physics (IOP), CAS in 2006. After graduation, he worked as a Post-doctoral Research Fellow at Technische Universität München (TUM), Germany, then joined at Institute for Fuel Cell Innovation, National Research Council Canada (NRC) as a Research Associate Officer; he has also worked as a Post-doctoral Research Fellow with Professor John B Goodenough at the University of Texas at Austin in 2010~2011. He has been a Full Professor and Group Leader of Energy Storage Materials and Devices in BINN since 2015. His current research interests include energy storage and conversion, e.g., lithium/sodium-ion batteries, metal-air batteries, all-solid-state batteries, fuel cells and self-power systems. He has published more than 80 peer-reviewed papers with a citation >3200 times, edited 4 book chapters and filed 13 Chinese patents. He has also received a number of awards, including the Outstanding Overseas Talents by the Institute of Physics CAS (2011), the Second Prize of Military Progress Prize in Science and Technology Advancement in China (2013) and the International Association of Advanced Materials (IAAM) Scientist Medal (2017).

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