学术报告

报告题目： **Development of High Performance Energy Storage and Conversion Devices**

报 告 人： 汪国秀　澳大利亚悉尼科技大学　教授

报告时间： **2014年12月30日（周二）下午2:30**

报告地点： 中科院固体物理研究所三号楼221会议室

报告人简介：

Professor Wang is a distinguished Professor and the Director of the Centre for Clean Energy Technology at University of Technology Sydney, Australia. He obtained his PhD from the University of Wollongong, Australia in 2001. He has published over 300 refereed journal papers with an H-index of 54. Most of them were published in high impact journals, which have attracted over 9000 citations. Prof. Wang's research interests include:

- Lithium ion batteries, lithium-air batteries and battery technology.
- Supercapacitors
- Catalyst materials for PEM Fuel-cells
- Hydrogen storage materials
- Semiconductor quantum dots, quantum wires and quantum tubes
- Molecular chemical and bio nanosensors
- Graphene and chemical functionalisation of graphene

报告内容简介：

In this talk, the research on nanostructure electrode materials for lithium-air batteries and sodium-ion batteries will be reported.

Rechargeable Li-O_2 batteries are considered to be one of the most promising systems for meeting today's stringent requirements as the power source for electric vehicles. The theoretical specific energy of the Li-O_2 battery is almost ten times higher than that of Li-ion batteries. I will report the synthesis of porous graphene with large macropores as cathode catalysts for Li-O_2 batteries which can efficiently increase the discharge capacity. Ru nanocrystal decorated porous graphene as cathodes for Li-O_2 batteries exhibited an excellent catalytic activity with a high reversible capacity, a low charge/discharge overpotential, and a long cycle life up to 200 cycles.

Sodium-ion batteries are being considered as a promising system for stationary energy storage and conversion. When used as cathode materials in sodium ion batteries, β-MnO_2 nanorods with exposed {111} crystal planes and a high density of (1 × 1) tunnels which leads to facile sodium ion insertion and extraction exhibited good electrochemical performance and satisfactory high-rate capability. Furthermore, single crystalline bilayered vanadium oxide nanobelts exhibited a high capacity.For anodes, The WS_2@graphene nanocomposite exhibited a high reversible sodium storage capacity, good cyclability and a satisfactory high rate performance.