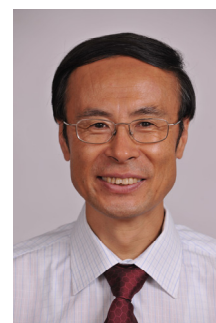


Nano/Microstructured Electrode Materials for Fuel Cell and Lithium-Ion Battery: Design, Chemical Synthesis and Property

Professor Wan Lijun (Director, Institute of Chemistry, Chinese Academy of Sciences)



2012年10月31日(水) 15:00–17:00

(創成科学研究棟5階大会議室)

<http://www.cat.hokudai.ac.jp/access.html>

Nanostructured materials are currently of interest as high performance electrode as anodes and cathodes for fuel cells and rechargeable lithium-ion batteries because of their novel size effects and significantly enhanced kinetics, which address much enhanced capacities, high rate performance and capacity retention abilities. However, their practical applications suffer from the problems of low thermodynamic stability and high surface reactions due to their high specific surface area and high surface energy. Electrode materials with nano/micro hierarchical structures are the best systems of choice because they can take both the advantages of nanometer-sized building blocks and micro- or submicrometer-sized assemblies.

This presentation is devoted to the structural design and chemical synthesis of carbonaceous electrode materials for fuel cells and Li-ion batteries, including nano/microstructured metal, metal oxides and carbon-containing nanoarchitected composites. The properties of the prepared materials are measured. The structures at the surface and interface of electrode/electrolyte are investigated by in-situ electrochemical STM. The presented results may help to provide insights on the electrode design for the devices related to energy conversion and storage.

問合せ先: 触媒化学研究センター・大澤雅俊 (osawam@cat.hokudai.ac.jp/011-706-9124)

References:

- [1] Guo, Y. G.; Hu, J. S.; Wan, L. J. *Adv. Mater.* 2008, 20, 2878-2887.
- [2] Ji, H. X.; Wu, X. L.; Fan, L. Z.; Guo, Y. G.; Mei, Y. F.; Schmidt, O. G. et al. *Adv. Mater.* 2010, 22, 4591.
- [3] Wu, X. L.; Jiang, L. Y.; Cao, F. F.; Guo, Y. G.; Wan, L. J. *Adv. Mater.* 2009, 21, 2710.
- [4] Zhang, W. M.; Hu, J. S.; Guo, Y. G.; Zheng, S. F.; Zhong, L. S.; Song, W. G.; Wan, L. J. *Adv. Mater.* 2008, 20, 1160.
- [5] Zhang, L. S.; Jiang, L. Y.; Chen, C. Q.; Li, W.; Song, W. G.; Guo, Y. G. *Chem. Mat.* 2010, 22, 414-419.
- [6] Cao, F. F.; Wu, X. L.; Xin, S.; Guo, Y. G.; Wan, L. J. *J. Phys. Chem. C* 2010, 114, 10308-10313.
- [7] Cao, F. F.; Guo, Y. G.; Zheng, S. F.; Wu, X. L.; Jiang, L. Y.; Bi, R. R.; Wan, L. J.; Maier, J. *Chem. Mat.* 2010, 22, 1908-1914.
- [8] Zhang, W. M.; Wu, X. L.; Hu, J. S.; Guo, Y. G.; Wan, L. J. *Adv. Funct. Mater.* 2008, 18, 3941- 3946.