

7th Annual Congress on

Materials Research and Technology

February 20-21, 2017 Berlin, Germany

Development of novel organic radical batteries

Shin'ichi Nakatsuji

University of Hyogo, Japan

Rechargeable batteries are widely used not only in portable equipments like cell phones or personal computers but also as the energy sources of automobiles and among them lithium-ion battery (LIB) technology is currently considered to constitute a reliable system for electricity storage with high energy density and design flexibility. Along with the development of such inorganic-based rechargeable batteries as LIB, it is of growing interest to develop organic-based ones for the next generation to improve the battery-performances by possible flexibilities of organic materials from chemical and physical viewpoints. We have been interested in developing new organic radical batteries containing dual redox units, i. e., a nitroxide radical together with another redox group such as ferrocene, 1,4-benzoquinone, anthraquinone, naphthalenediimide, or disulfide to increase the charge storage capacities and to obtain unique charging-discharging properties. We wish to report in this paper some of our recent results in the development of novel organic radical batteries incorporating a nitroxide radical and another redox unit. The development of new dye salts with a radical unit will also be reported at the same time that are expected to show relevant redox and photosensitizing properties useful for dye-sensitizing solar cells (DSSCs). Cf. Armand M, Tarascon J -M (2008) *Nature* 451: 652; Nishide H, Oyaizu K (2008) *Science* 319: 737; Poizot P, Dplhem F (2011) *Energy, Environ. Sci.* 4: 2003. Nakatsuji S, Fujiwara K, Akutsu H, Yamada J, Satoh M (2013) *New J. Chem.* 37: 2468 and references therein.

Biography

Shin'ichi Nakatsuji obtained his PhD from Osaka University on the chemistry of dehydroannulenes in the field of structural organic chemistry. After studied as a JSPS postdoctoral fellow at the same university, he joined Faculty of Pharmaceutical Sciences at Nagasaki University, first as an assistant then as an associate professor and worked in the field of dye chemistry and organic analytical chemistry. He worked one year at TH (now TU) Darmstadt in west Germany as an Alexander von Humboldt fellow. He then moved to the newly founded Faculty of Science at Himeji Institute of Technology (since 2004 University of Hyogo), where he has initiated the studies on the development of new functional organic materials, such as organic conductors, organic magnetic materials, liquid crystals, and organic batteries. He has recently been retired the university and is now a professor emeritus. He has published over 220 scientific papers and has been awarded the distinction of Doctor Honoris Causa from Technical University of Iasi in Romania.

nakatsuji@sci.u-hyogo.ac.jp

Notes: