



高分子学会九州支部 外国人学者講演会



Strategies to manipulate the surface properties of poly(3,4-ethylenedioxythiophene) thin films through electropolymerization and molecular design for sensing applications

Prof. Shyh-Chyang Luo

Department of Materials Science and Engineering, National Cheng Kung University, No. 1, Sec. 4, Roosevelt Road, Taipei 10617, Taiwan

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場所：九州大学伊都キャンパス 先導物質化学研究所 CE41 1F セミナー室

主催：高分子学会九州支部

共催：九州大学高分子機能創造リサーチコア

Shyh-Chyang Luo 先生は、PEDOT 薄膜をセンサーとして利用することを目的として、電解重合や分子設計に基づいた表面処理法の開発を進めています。皆様の多数のご参加をお待ちしております。

Abstract: Poly(3,4-ethylenedioxythiophene) or PEDOT has been demonstrated in various biomedical applications, ranging from biosensing to medical bionics. Being a conductive biointerface, PEDOTs can be served as an electrode for either electrochemical biosensing or to provide electrical stimuli on attached biomolecules. The functional groups on PEDOTs play an important role for the modification of surface property. In this presentation, I would like to introduce our strategies to manipulate the surface properties of PEDOT thin films for sensing applications. The control of functional density is a key for tuning the bio-recognition event. Besides, the surface properties, such as morphology and charges, are also critical to the detection sensitivity. For example, the control of surface charge can enhance the interaction between charged biomolecules, such as dopamine, and PEDOT surfaces through coulomb force, which leads to a higher detection of these biomolecules. The recognition between specific molecules and functional groups, including phosphorylcholine and boronic acid groups, can also be used for the detection purpose. The recognition process between these functional groups on PEDOT thin films and targeted biomolecules are generally monitored by using a quartz crystal microbalance. The attached biomolecules usually alter the charge distribution on PEDOT surfaces, which can also be measured by using an electrochemical technique. Furthermore, the influence of non-specific binding and anti-fouling properties on the sensing will be emphasized in this presentation.

Brief Resume: Prof. Luo received his B.S. (in Chemistry) and M.S. (in Materials Science and Engineering) from National Taiwan University in 1996 and 1998, respectively. He then went to United States in 2001 and received his Ph.D. degree (in Materials Science and Engineering) from the University of Florida in 2005. Prior to joining the Department of Materials Science and Engineering at the National Taiwan University in 2015, he was a post-doctoral research fellow at Institute of bioengineering and Nanotechnology, Singapore from 2006 to 2009, an ASI research scientist at RIKEN Advanced Science Institute, Japan from 2009 to 2013 and an assistant professor at Department of Materials Science and Engineering, National Cheng Kung University, Taiwan from 2013 to 2015. His current research interests include organic conducting materials, biointerfaces, electrochemical biosensors, bioelectronics, and stimuli -responsive materials for bioengineering applications. He has published more than 30 papers in the field of conducting polymers. Because of his achievement in the field, in 2013, he was invited to be as a guest editor of a top journal in polymer science, *Polymer Reviews*, to organize a special issue “*conducting polymers as biomaterials and biointerfaces*”.

連絡先 九州大学先導物質化学研究所 分子集積化学部門 高原 淳
Phone: 092-802-2517、FAX: 092-802-2518
E-mail: takahara@cstf.kyushu-u.ac.jp