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CV/ biography

Yann LEROUX is a junior researcher at the CNRS in France. He is a physical-chemist, specialized in electrochemistry and surface sciences. He obtained his PhD from the University of Paris VII – Denis Diderot, Paris, France, in 2007 under the supervision of Pr. Jean-Christophe Lacroix. During this time, he focused his researches in the design and realization of active plasmonic devices and electrochemically generated atomic contacts. Between 2008 and 2009, he held a post-doctoral position in the group of Pr. Marcel Mayor in Basel, Switzerland, one of the world leaders in molecular electronics. Since 2009, he is now a CNRS researcher, in the group of Dr. Philippe Hapiot in Rennes, France. His main research activities are the surface modification and characterization by localized electrochemical methods. He is currently looking for self-organized molecular architecture using aryl diazonium chemistry, along with the development of Scanning Electrochemical Microscopy (SECM). His activity has led to the publication 44 peer-review international research papers. He received in 2008 the PhD prize from the French Chemical Society, in 2012 the International Society of Electrochemistry travel award for young electrochemist and in 2019 the Junior researcher award in Electrochemistry from the French Chemical Society.

Molecular sieving and current rectification properties in ultrathin organic films

Abstract

The (electro-) reduction of aryl diazonium salts[1] is nowadays a common technique used to functionalize many surfaces. Aryl diazonium salts (electro-) reduction was proposed for a wide range of applications, ranging from corrosion protection, active plasmonic devices, to super-capacitors and molecular diodes.[2] Devices allowing the control of molecular transport and electron transfer such as molecular sieves and rectifiers are of high interest. Electrochemical devices with current rectification properties have been originally reported by Murray *et al*.[3] Briefly, electrochemical current rectifiers (ECR) consist in surfaces functionalized by redox species allowing unidirectional current of solution-phase redox probe to pass through. Despite the versatility and robustness of the procedure, only very few examples of ECR fabricated by the electro-reduction of aryl diazonium salts were demonstrated. The design of molecular sieves also attracts attention of many research groups these days as they could find utility in tomorrow applications as water desalination, gas separation or acting as membrane in fuel cells.[4] The reduction of aryl diazonium salts generally yields dendritic multilayered films, i.e. unorganized films. Hence the intrinsic nature of these films is not suitable for molecular sieving. In this work,[5] we report the formation of ultrathin organic films through the electro-reduction of aryl diazonium salts having both electrochemical current rectification properties and molecular sieving properties. Results reveal that both specific properties are due to the organization of the deposited thin organic films.

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