Self-Assembly of Organic Molecules on Reactive Metal Substrates

Yongfeng TONG
(Ligne TEMPO, Synchrotron SOLEIL, Gif sur Yvette et ISMO, Orsay, France)

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In this thesis, I report on the formation of self-assembled monolayers of different chalcogenide and planer π-conjugated molecules. Their electronic and structural properties were systematically studied mainly by synchrotron based X-ray photoelectron spectroscopy, scanning tunneling microscopy and low energy electron diffraction. A layer-by-layer assembly of dithiol on ZnO(0001) with intermediate metal deposition was performed and the formation of hybrid organic-inorganic self-assembled structure was obtained. High-resolution XPS and near edge absorption fine structure spectroscopy study allowed to investigate the characteristics of self-assembled monolayers of benzeneselenol and selenophene on Cu (100), as well as dihexyldiselenide on Ni(111) and Pd(111). We have observed the existence of Se-C bond breaking processes and the presence of different adsorption sites of the molecules. On the other hand, we revealed the formation of a 5,5- bis(mercaptomethyl)-2,20- bipyridine (BPD) self-assembled monolayer with SH termination on ZnO(0001), which we have taken as a template for the grafting of Ag and Ni and then the assembling of BPD on this metal-dithiol layer.

In the last part of this thesis, we investigated the properties of self-organized large n-conjugated molecule NTCDA on metal surfaces. The NTCDA monolayer deposited by thermal evaporation shows highly packed structures with different domains and a lying-down orientation was regularly observed. With increasing the coverage, significant structural modifications were obtained and studied by XPS and NEXAFS.

Les membres du jury sont :

- Dr. Hafs. Korri-Youssoufi, Université Paris-Sud
- Pr. Maurizio. Canepa, Université de Genova (Italie)
- Pr. Yannick Fagot-Reverat, Université de Lorraine
- Pr. Abdelkader Kara, Université de Floride (USA)
- Dr. Vladimir Esaulov, Université Paris-Sud
- Dr. Azzedine Bendounan, Synchrotron SOLEIL

Formalités d’entrée : accès libre dans l’amphi du pavillon d’Accueil.
Si la manifestation a lieu dans le Grand Amphi SOLEIL du Bâtiment Central merci de vous munir d’une pièce d’identité (à échanger à l’accueil contre un badge d’accès)