

## **Covalently-bounded nano-architectures by on-surface photopolymerization**

Authors : Irma Custovic, Wael Hourani, Damien Teyssieux, Judicaël Jeannoutot, Michel Feron, Younes Makoudi, Frank Palmino and Frédéric Chérioux

Institut FEMTO-ST, Université de Bourgogne Franche-Comté, CNRS, 15B Avenue des Montboucons, 25030 Besançon cedex, France

Abstract :

The fabrication of robust and conjugated organic nano-architectures deposited on surfaces is a key-challenge in order to build smart components. Most of covalent nano-architectures are obtained by thermally-induced on surface chemistry with an effective catalytic role of surfaces (Ullmann cross-coupling, Glaser cross-coupling, etc.). Nevertheless, as molecular diffusion is also promoted by an increasing of the temperature, it is very difficult to achieve well-ordered covalently-bounded nano-architectures by these on-surface reactions.

Photopolymerization of molecules is a powerful method to obtain organic polymers, because photopolymerization is not thermally-induced and does not require any catalytic role of the surface. Nevertheless, this strategy is still rare on surfaces despite of its interests.

Here, we investigate the photopolymerization of supramolecular networks adsorbed on different surfaces (Si(111)-B, Cu(111), HOPG) by illumination with an ultra-violet (UV) light. All experiments were monitored by Ultra-High Vacuum Scanning Tunneling Microscopy (UHV-STM). We observe the formation of covalently-bounded nano-architectures, like nanowires, depending of geometry of the starting supramolecular networks. The properties of obtained polymers (air-stability, charge transport abilities, etc.) are currently under investigation with Atomic Force Microscopy (AFM) under ambient conditions.