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On-surface synthesis of aligned functional nanoribbons monitored by scanning tunnelling microscopy and vibrational spectroscopy

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In the blooming field of on-surface synthesis, molecular building blocks are designed to self-assemble and covalently couple directly on a well-defined surface, thus allowing the exploration of unusual reaction pathways and the production of specific compounds in mild conditions. Up to now, most of the single-layered surface covalent organic frameworks (SCOFs) have been prepared by Ullmann dehalogenation reactions of brominated aromatic compounds or trimerization of diboronic acids. Here we present our results concerning the creation of functionalized organic nanoribbons on the Ag (110) surface by mean of an oxidative coupling unprecedented in the literature. Interestingly, length of the resulting nanoribbons could be efficiently controlled by mean of the temperature deposition whereas the anisotropic substrate could act as an efficient template fostering the alignment of the nanoribbons, up to the full monolayer regime.

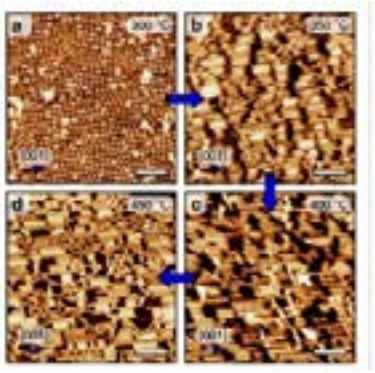

Figure 1. Nanoribbon formation and their evolution upon further annealing

Biography

Frederic Dumur has completed his PhD from Angers University (France) in 2002. From 2003 to 2008, he was successively a Postdoctoral Fellow in the group of Professor Ben L. Feringa (2003-2005), Nobel Prize 2016, Dr. Norbert Hoffmann (Reims, France), and Professor Francis Sécheresse (Versailles, France). Since 2008, he is Associate Professor at the Institute of Radical Chemistry of Aix Marseille University. He has published more than 180 papers in international journals. Frederic Dumur is specialized in the design of photoinitiators of polymerization under soft irradiation conditions. His research interest also includes the design of polymers for optoelectronics applications (2D polymerization on metal surfaces).

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