UNIVERSITÉ DE GENÈVE
FACULTY OF SCIENCE
Department of Quantum Matter Physics

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Auditoire Stückelberg
Ecole de Physique

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Functional Organic Nanostructures on Surfaces: Towards Atomically Designed Nanoelectronics, Optoelectronics and Catalysis

Supramolecular chemistry on surfaces [1] – where organic molecules and atoms are used as building units for the assembly of well-defined nanostructures – offers compelling avenues for designing materials with atomic-scale precision and tailored electronic properties. Here, I will focus on one-dimensional (1D) and two-dimensional organic and metal-organic nanostructures, resulting from on-surface interactions between flat aromatic molecules and transition metal adatoms. The local atomic-scale intramolecular morphology, electronic and chemical structure, and electrostatic properties of these systems are characterized by a combination of low-temperature scanning tunneling microscopy and spectroscopy, non-contact atomic force microscopy, X-ray absorption spectroscopy and density functional theory. This bottom-up on-surface synthesis approach offers means for the synthesis of low-dimensional nanostructures with unusual morphologies and properties, that cannot be achieved via conventional synthetic chemistry methods, paving the way for atomically designed materials with novel electronic and catalytic functionalities.

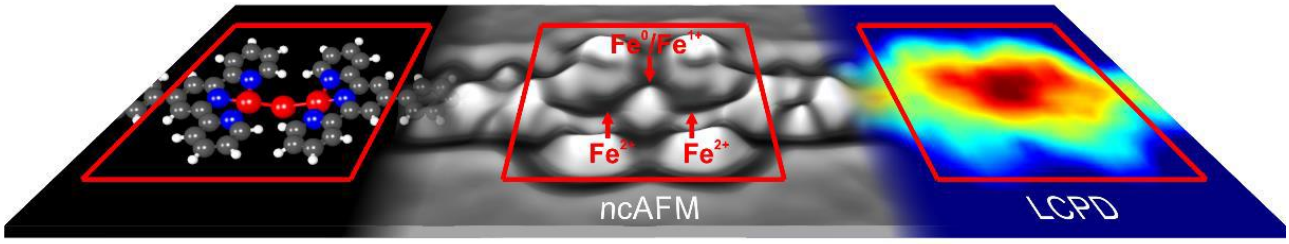

Figure 1. Self-assembly of 1D coordination nanostructure on a metal surface. Chemical structure, non-contact atomic force microscopy image and local contact potential difference map [2].

References

[1] J.V. Barth, Annu. Rev. Phys. Chem. 58, 375-407 (2007).
[2] C. Krull et al., Nat. Commun. 9, 3211 (2018).

Organisé par : Prof. Felix Baumberger