

MSc Thesis & BSc projects:

2D molecular frameworks

Controlling the electronic properties of extended networks via on-surface chemistry.

The isolation of a single layer of graphite in 2004 started a new “gold rush” towards the synthesis of 2-dimensional (2D) molecular frameworks. As a consequence of their low dimensionality, these molecular systems show new intriguing and exotic properties, which raised a huge interest among the scientific community, boosting the research activity in this field. Depending on the symmetry of organic linker, different types of lattices can be obtained. Among them, Kagome lattices, which can be seen as a two-dimensional network of corner-sharing triangles, have gained a lot of interest because they exhibit nontrivial electronic properties. In fact, their lattice symmetry results in topological flat bands, endowing electrons with unusual properties, especially novel quantum states.

Tailoring on-demand the electronic properties of these novel will pave the way for the design and fabrication of next-generation optoelectronic devices.

The proposed BSc. or MSc. projects aim at controlling the electronic structure of such molecular frameworks by on-surface chemistry techniques and by tuning the metal-molecule interaction. The proposed systems will be investigated by means of state-of-the-art photoemission and microscopy methods, such as Photoemission Orbital Tomography and Scanning Tunnelling Microscopy.

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