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## Janus tectons : a versatile platform for reaching long-range 2D and pseudo-3D non-covalent Surface-confined self- assemblies on sp<sup>2</sup>-carbon based substrates

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Beyond the well-mastered two-dimensional (2D) supramolecular self-assembly at surfaces by physisorption of flat molecular building-blocks (tectons)<sup>1</sup>, the next challenge consists in providing an universal strategy exploiting the room above the substrate, i.e. the direction perpendicular to the surface, in order to add a functionality which mustn't disturb the 2D self-assembly and be preserved from possibly-detrimental substrate influences : this could open opportunities for example in molecular electronics<sup>2</sup> and sensors<sup>3</sup>, molecular spintronics<sup>4</sup> or fast DNA sequencing in the field of bioinformatics<sup>5</sup>.

In this context, we reported the first example of a general strategy for generating physisorbed monolayers on flat sp<sup>2</sup>-carbon based substrates, exposing a wide range of external interfacial composition<sup>6a,b</sup>. More precisely, two family of tectons have been recently synthesized in view of forming physisorbed adlayers exposing either a wide variety of small terminal chemical group (-CN, -CO<sub>2</sub>Me, -CHO, -CO<sub>2</sub>H, -Br, -PhCN) or functional moiety, in this first attempt diamino triazine, terpyridine, and ferrocene units : this approach is validated through the supramolecular self-assembly study by scanning tunneling microscopy (STM) at the liquid/HOPG and graphene interface and molecular mechanics modeling<sup>6c</sup>. In addition, we will focus on interesting results related to the long-Range and 3D Linear Non-covalent Functionalization of Fullerene Derivatives on HOPG through Surface-confined Self-Assembled Janus Tecton Approach<sup>7</sup>: the chemistry strategy will be detailed before discussing modeling, optical and STM studies. Finally, we will describe the recent obtaining of an innovative fluorescent molecular self-assembly on graphene, based on another molecular design, before to present few unpublished results.

**主催:九州大学 最先端有機光エレクトロニクス研究センター  
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