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SAMs diversity via molecular conformation selection of functionalized C60¹ BOGDAN DIACONESCU, TENG YANG, MIKAEL JAZDZYK, GLEN MILLER, DAVID TOMANEK, KARSTEN POHL, University of New Hampshire — Structured organic thin films are relevant for many emerging technologies like optoelectronic molecular devices, energy conversion, and biosensors. The structural arrangement of molecules forming self-assembled monolayers (SAMs) is a consequence of molecular shape, and the competing molecule-substrate and intermolecular interactions. We will present a STM/DFT study of the self-assembly of C60 functionalized with alkyl chains of various lengths (F-C60) on compact metal surfaces [1] and graphene layers. We find that the molecule surface interaction drives the selection of particular molecular conformations resulting in diverse SAM structures as a function of the alkyl chain lengths. The SAM structures are ranging from zigzag to linear arrays of C60 cages. These results show that C60s can be assembled in 2D and non-compact molecular arrays with a unit cell symmetry and size controllable via appropriate chemical functionalization and surface selection.

[1] B. Diaconescu, et al., Phys. Rev. Lett., 102, 056102, 2009.

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Bogdan Diaconescu
University of New Hampshire

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