Abstract Submitted
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Structural evolution of the self-assembled layers of funtionalized fullerenes on metal surfaces. BOGDAN DIACONESCU, Department of Physics, University of New Hampshire, MIKAEL JAZDZYK, GLEN MILLER, Department of Chemistry, University of New Hampshire, KARSTEN POHL, Department of Physics, University of New Hampshire — Self-assembled organic thin films have a great number of practical applications, ranging from sensors and biological interfaces in medical implants to organic electronics and photovoltaics. Self-assembled monolayers (SAMs) form as a result of a delicate balance between competing molecule-substrate and intermolecular interactions. To control such self-assembly processes, it is mandatory to understand how this balance reflects onto the SAM's final structure. Here, we present a STM study of the self-assembly of C60 functionalized with alkane chains of various lengths (F-C60) on Ag(111). We find that F-C60 molecules lay down on the Ag surface and form a zigzag like pattern with an oblique unit cell of size dependent on the alkyl chain lengths and two molecules per basis. The C60s are placed at a larger than van der Waals distance. The symmetry of the F-C60 SAM is dictated by the alkane-surface interaction while the size of the unit cell is a consequence of the intermolecular interactions. These results show that C60s can be assembled in 2D and non-compact molecular arrays with a surface density controllable via appropriate chemical functionalization. Funded by the NSF Center for High-rate Nanomanufacturing (NSF NSEC-425826).

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