Abstract Submitted
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Meandering C_{60} Chains on Organic Film Substrates[1] WEI JIN, University of Maryland, DANIEL DOUGHERTY, National Institute of Standards and Technology (currently at North Carolina State University), QIANG LIU, WILLIAM CULLEN, JOHN WEEKS, University of Maryland, STEVEN ROBEY, National Institute of Standards and Technolgoy, JANICE REUTT-ROBEY, University of Maryland — Meandering chains of C_{60} molecules are observed following vapor deposition of C_{60} on a variety of organic molecular films including pentacene and zinc phthalocyanine,as well as previously reported a-sexithiophene. Such filamentous structures are in complete contrast to C_{60}'s typical close-packed growth habit, but are reminiscent of dipole fluids. We present STM images and a statistical analysis of chain structures observed for 0.2 - 0.9 mL C_{60} on the square ZnPc overlayer ($a = 13.6\,\mathring{A}, b = 14.5\,\mathring{A}, \alpha = 89°$)on Ag (111). Large islands of meandering C_{60} islands indicate >50 nm C60 diffusion lengths on this ZnPc film. The C_{60} chain length, $\ell \sim 20$ nm, depends weakly on coverage, reflecting the ∼constant C_{60} density within these islands, and exhibits multiple branches. Chain structures are compared to the molecular dynamics predictions of a 2-d dipole fluid with the C_{60} - C_{60} interaction described by the Girifalco Potential (1 eV attraction) with additional dipole terms. A vertical moment of ∼0.8 D simulates filament formation. The structure of the ZnPc support, not included in this simulation, appears to be a secondary consideration in these chain structures.

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