Abstract Submitted
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The effect of self-assembled monolayers on graphene conductivity and morphology T. L. MOORE, J. H. CHEN, B. RIDDICK, E. D. WILLIAMS[1], University of Maryland, College Park — Graphene transport properties are limited by charge defects in SiO_2, and by large charge density due to strong interaction with SiC. To modify these effects we have treated 300 nm SiO_2 with tricholosilanes with different termination groups including pure and fluoro and amino-terminated hydrocarbons for use as substrates for mechanical exfoliation of graphene. XPS measurements verify the presence of the expected termination groups. AFM measurements reveal modified monolayer roughness and correlation lengths; for a fluorinated carbon chain the RMS roughness is 0.266 $\pm$ 0.017 nm and the correlation length is 10.2 $\pm$ 0.7 nm compared to 0.187 $\pm$ 0.011 nm and 19.8 $\pm$ 2.5 nm for SiO_2. Surface free energies of the monolayers and the SiO_2 blank have been computed from static contact angle measurements and all decrease the SiO_2surface free energy; for the fluorinated carbon chain monolayer a decrease of 20 mJ/m^2 from SiO_2. We will discuss the ease of exfoliation, and the morphology and conductivity of graphene on these monolayers.

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