

The Use of Single Molecule Force Spectroscopy in Probing Poly(dimethylsiloxane)-Functionalized Graphene Sheet Interface

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Functionalized graphene sheet (FGS) has drawn large interest for its application as a multi-functional filler in polymer nanocomposites. It has been demonstrated that FGS can simultaneously improve the mechanical, electrical and thermal properties of the polymer matrix. [1], [2] The key for the property improvement strongly depends on the interface between the polymer matrix and FGS. To understand the interfacial interaction, single molecule force spectroscopy (SMFS) is used to measure the force when a polymer chain desorbs from a solid surface. The interaction between poly(dimethyl siloxane) (PDMS) and mica, as well as PDMS and FGS, were characterized using SMFS. PDMS functionalized tip was put in contact with the substrate and retracted. Peak and plateau were observed in the force profile during retracting. Interpretation for them is discussed.

- [1] Schniepp, H.C., et al., Journal Of Physical Chemistry B, 2006. **110**(17): p. 8535-8539.
- [2] T. Ramanathan, A.A.A., S. Stankovich, D. A. Dikin, M. Herrera-Alonso, R. D. Piner, D. H. Adamson, H. C. Schniepp, X. Chen, R. S. Ruoff, S. T. Nguyen, I. A. Aksay, R. K. Prud'Homme, L. C. Brinson, Nature Nanotechnology, 2008. **3**: p. 327 - 331