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**Sequence-Dependent Force Response During Peeling of Single Stranded DNA from Graphite** ANAND JAGOTA, SURESH MANOHAR, DMITRI VEZENOV, Lehigh University — We have analyzed the statistical thermodynamics of peeling single- stranded DNA (ssDNA) from the surface of graphite. Using parameters obtained from recently reported single-molecule peeling experiments, we model ssDNA as a polymer chain strongly adsorbed to a frictionless substrate. Three polymer models were analyzed, namely, freely jointed chain, worm-like chain and rotational isomeric state models. All three models predict similar thermodynamics of peeling - steady peeling force under force control, in agreement with single-molecule experiments, and measurable spikes in force under displacement control for finite length chains (<25). A simple transition model was developed to predict, quantitatively, the decay in the peak and valley values of force spikes with increasing end-to-end distance of the desorbed chain. These force spikes carry information about the underlying sequence of ssDNA, which might thus be measurable with a sufficiently stiff loading system. In the case of the freely jointed chain model, under force control, we have obtained several exact closed-form results and provide relations between the measured peel force and the underlying adhesion free energy.

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