

Abstract Submitted
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Dielectric Effects on Polyelectrolyte Adsorption Studied by a Local Monte Carlo Algorithm JIAN JIANG, ZHEN-GANG WANG, California Institute of Technology — We study the effects of dielectric discontinuity on polyelectrolyte (PE) adsorption and double layer properties using an improved local Monte Carlo algorithm originally proposed by Maggs and Rossetto [A. C. Maggs and V. Rossetto, *Phys. Rev. Lett.* **88**, 196402 (2002)]. We distinguish between two different mechanisms for PE adsorption, one due to electrostatic attraction, and the other due to van der Waals type attraction. For both systems, as a result of image charge repulsion, the threshold for PE adsorption is increased in terms of the surface charge density and the strength of the van der Waals attraction. For electrostatically driven adsorption, we find nearly all the monomers of the PE are captured by the surface when the surface charge exceeds the adsorption threshold. For adsorption driven by van der Waals attraction, only partial monomers are adsorbed onto the surface—the adsorbed chain has many loops extending away from the surface. The addition of salt is shown to have opposite effects on the adsorption threshold and the amount of adsorption in these two cases. In addition, due to counterion condensation on the PE backbone, the adsorption of the PE chain is accompanied by a concurrent significant adsorption of the counterions.

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