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Screening of Electroosmotic Flow by Long-Chain Polymer Coatings PING HE, Clemson University, RUI (JIM) QIAO[1], Clemson University
— Electroosmotic flow (EOF) is a popular transport mechanism used in micro/nanofluidic systems. Polymer coating has been widely used to control EOF with varying degrees of success. However, the fundamental mechanism of flow control is not well-understood. One key difficulty is that when a surface is coated with polymers, there can exist a two-way coupling between the flow and polymer conformation. Therefore, fluid flow and polymer conformation must be solved self-consistently to predict the screening of flow. Here we report on the particle simulation of screening of electroosmotic flow by neutral polymer grafted on a charged surface. Our simulation results indicate that, as the unscreened electroosmotic velocity increases, the effective polymer thickness decreases and the polymers tend to orient in the flow direction. Such variations of the polymer conformation become less sensitive to the unscreened flow velocity as the unscreened velocity increases. The simulation results indicate that the degree of flow screening decreases as the unscreened flow velocity increases, in consistent with earlier theoretical predictions (Harden, Long and Ajdari, *Langmuir*, **17**, 705, 2001)

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