

Abstract Submitted
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Self Consistent Field Theory Study of the Effect of Grafting Density on the Height of a Weak Polyelectrolyte Brush KEVIN WITTE, YOU-YEON WON, Purdue University — The height of weakly basic polyelectrolyte brushes in the osmotic brush regime is studied as a function of the grafting density using a numerical self-consistent field (SCF) theory derived from the (semi-) grand canonical partition function. The theory is shown to properly account for the local nature of the charge equilibrium and to be able to capture the basic behaviors of polyelectrolyte brushes, including brush height variation with salt concentration and scaling with respect to degree of polymerization. However, we find, in agreement with recent experiments, that the scaling of brush height with grafting density is qualitatively different than that predicted by basic scaling arguments. This difference is attributed to the relative strength of electrostatic type interactions compared to finite segment size packing constraints.

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