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Anisotropic Fluctuation Effects in Polyelectrolyte Adsorption YING JIANG, QIANG WANG, Colorado State University — We have examined the fluctuation effects on the adsorption of flexible polyelectrolytes on flat substrates using the theory of anisotropic composition fluctuation. We expand the free energy functional in terms of perturbations around the self-consistent mean-field solution of the inhomogeneous system. Setting the functional derivatives with respect to the perturbations of the field variables to zero produces a set of self-consistent equations; the zeroth-order expansion corresponds to the mean-field result and the 2nd-order expansions represent the Gaussian fluctuations in the system. The composition fluctuations result in stronger charge inversion than obtained in our previous self-consistent field calculations for the same system. Our study shows that the fluctuation and correlation effects in the system give the predominant contributions to charge inversion, in agreement with other theoretical and experimental studies.

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