Abstract Submitted for the MAR15 Meeting of The American Physical Society

Planar dipolar polymer brush: field theoretical investigations¹ JYOTI MAHALIK, RAJEEV KUMAR, BOBBY SUMPTER, csmd division, Oak Ridge National Lab, 1 Bethel valley Rd, Oak Ridge, TN, 37831 — Physical properties of polymer brushes bearing monomers with permanent dipole moments and immersed in a polar solvent are investigated using self-consistent field theory (SCFT). It is found that mismatch between the permanent dipole moments of the monomer and the solvent plays a significant role in determining the height of the polymer brush. Sign as well as magnitude of the mismatch determines the extent of collapse of the polymer brush. The mismatch in the dipole moments also affects the force-distance relations and interpretation of polymers in opposing planar brushes. In particular, an attractive force between the opposing dipolar brushes is predicted for stronger mismatch parameter. Furthermore, effects of added monovalent salt on the significance of dipolar brushes will also be presented. This investigation highlights the significance of dipolar interactions in affecting the physical properties of polymer brushes.

¹Csmd division, Oak Ridge National Laboratory, 1 Bethel Valley Rd, Oak Ridge, TN 37831, USA

Jyoti Mahalik csmd division, Oak Ridge National Lab, 1 Bethel valley Rd, Oak Ridge, TN, 37831

Date submitted: 14 Nov 2014

Electronic form version 1.4