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Polydispersity Effects on Scaling Behavior of Polymers Grafted on Surfaces of Varying Curvature PAUL DODD, ARTHI JAYARAMAN, University of Colorado at Boulder — Nanoparticle assembly can be tuned by grafting nanoparticle surface with polymers and in turn manipulating the interactions between the particles and medium. Despite past studies showing the importance of graft molecular weight on effective inter-particle interactions in monodisperse polymer grafted nanoparticles, and evidence of non-trivial polydispersity effects in systems containing polymers grafted on flat surfaces, not much work has been done to explore polydipsersity effects in polymer grafted nanoparticles. Using Monte Carlo simulations we elucidate how polydispersity (PDI) in grafted chain lengths affects chain conformations, and in turn the scaling behavior in systems of polymer grafted particles, as a function of grafting density and particle size. With increasing PDI the scaling exponent of the grafted chains at intermediate and high grafting density approaches that of a single chain grafted on the nanoparticle of same size. This is because longer chains in polydisperse systems have to stretch less due to reduced crowding from neighboring shorter chains as compared to monodisperse system. Also, due to reduced crowding effects at high PDI, in densely grafted particles the differences in chain conformations arising from varying curvature becomes negligible.

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