

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Forces between nanorods with end-adsorbed chains in polymer melts AMALIE FRISCHKNECHT, Sandia National Laboratories — Adsorbed or grafted polymers are often used to provide steric stabilization of colloidal particles. When the particle size approaches the nanoscale, the curvature of the particles becomes relevant. Here I use a classical density functional theory to study the polymer-mediated interactions between two nanorods. The rods are immersed in an athermal, melt polymer blend consisting of: 1) a small fraction of chains of length $N=20$ with “sticky” ends that are attracted to the rods with energy e/kT so that they form a polymer brush on the rods; and 2) a matrix of chains of length P which have no interactions with the rods. The structure of the brushes depends on the nanorod diameter, P , and e/kT . There is an attractive well in the force between the rods near contact, followed by a strong repulsion as the brushes are compressed. The depth of the well increases with increasing P . I will discuss the implications for experimental systems. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy’s National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Date submitted: 12 Dec 2007

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