Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Effect of polymer-nanoparticle interactions on the capillary rise infiltration of polymers into nanoporous media[1] DAVID RING, AMIT SHAVIT[2], ROB RIGGLEMAN, DAEYEON LEE, Univ of Pennsylvania — By wicking a polymer into a porous packing of nanoparticles, it is possible to generate polymer nanocomposites with extremely high filler fractions. Although capillary rise of simple fluids in porous media is fairly well understood based on the Lucas-Washburn model, there remain many unanswered questions related to the infiltration of high molecular weight polymer melts in nanoporous media. In this work, we probe the thermally induced infiltration of polymers into packings of nanoparticles using molecular dynamics (MD) simulations. In particular, we investigate the effect of polymer-nanoparticle interactions on the three phase contact angle of the polymer on the nanoparticle surface, and probe how the infiltration process is affected by changes in these interactions. We also study the effect of molecular weight on the capillary rise behavior of polymers in nanoparticle packings.

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Date submitted: 06 Nov 2015 Electronic form version 1.4