Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Effective diffusion rate through a random polymer network in tension HASSAN MASOUD, ALEXANDER ALEXEEV, Georgia Institute of Technology — Random networks of elastic material, such as polymer gels and cytoskeletal structures, are frequently found in synthetic and biological materials. Diffusion of nanoparticles through these networks and their mechanical properties has been extensively investigated over the past years. However, little attention has been paid to the diffusion rate through networks subject to mechanical deformation. Here, using two mesoscopic simulation methods, we examine the effective diffusion of nanoscopic particles through a random network of elastic material in tension. The mesoscopic methods used are as follows: 1) Bond-bending lattice spring model (LSM) that consists of lattice sites connected by one-dimensional harmonic spring and captures the deformation of a random elastic network. 2) Dissipative particle dynamics (DPD) that explicitly resolves the hydrodynamic interactions between the network and particles.

Hassan Masoud
Georgia Institute of Technology

Date submitted: 20 Nov 2009 Electronic form version 1.4