

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Analysis of Diffusion through Dynamic Network Polymers using Multi-photon Fluorescence Recovery after Photobleaching** JIAHUI LI, Department of Chemical Engineering, University of Rochester, KELLEY SULLIVAN, EDWARD BROWN, Department of Biomedical Engineering, University of Rochester, MITCHELL ANTHAMATTEN, Department of Chemical Engineering, University of Rochester — Multi-Photon Fluorescence Recovery after Photobleaching (FRAP) techniques are utilized to study small molecule transport through polymer networks containing multiple hydrogen-bonding functional groups. Experiments involve uniformly dispersing small dye molecules (fluorophores) into functionalized polymers and networks. Polymer samples are then locally bleached, and the recovery of fluorescence is studied using 2-photon fluorescence microscopy. By curve-fitting fluorescence recovery curves to a model, diffusion coefficients are obtained. We have investigated series of polymer networks containing H-bonding interactions with different compositions at different temperatures. The diffusion coefficient through these polymer networks shows an expected Arrhenius-like temperature dependence. The influence of hydrogen bonding and network architecture on transport activation energies will be discussed.

Jiahui Li  
Department of Chemical Engineering, University of Rochester

Date submitted: 16 Dec 2008

Electronic form version 1.4