Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Why nanoconfinement may lead to the development of polymer glasses that do not physically age RODNEY PRIESTLEY, LINDA BROADBELT, JOHN TORKELSON, Department of Chemical and Biological Engineering, Northwestern University — With the advent of nanotechnology, polymers will be used at increasingly smaller length scales, *i.e.*, the nanoscale. Recently, it has been shown that nanoconfined polymers can exhibit astounding changes in glassy-state properties relative to bulk. Physical aging, *i.e.*, the change in properties as a function of annealing time below the glass transition temperature, determines the end-use properties of polymer glasses. How nanoconfinement impacts aging has emerged as a key technological and scientific question. Conventional techniques for monitoring aging of bulk polymers are incapable of doing so for nanoconfined polymers. Here, we present work in which we have developed fluorescence methods to monitor aging in thin polymer films. More importantly, our technique allows for the monitoring of aging at specific locations in films near interfaces. Our work indicates that nanoconfinement and interfacial effects strongly alter aging and that the development of polymer glasses that do not physically age may be possible.

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Date submitted: 27 Nov 2007 Electronic form version 1.4