Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Driven Polymer Translocation into a Crosslinked Gel DAVID SEAN, GARY W. SLATER, University of Ottawa — In a typical polymer translocation setup, a thin membrane is used to separate two chambers and a polyelectrolyte is driven by an electric field to translocate from one side of the membrane to the other via a small nanopore. However, the high translocation rate that results from the forces required to drive this process makes optical and/or electrical analysis of the translocating polymer challenging. Using coarse-grained Langevin Dynamics simulations we investigate how the translocation process can be slowed down by placing a crosslinked gel on the trans-side of the membrane. Since the driving electric field is localized in the neighborhood of the nanopore, electrophoretic migration is only achieved by a "pushing" action from the polymer segment residing in the nanopore. For the case of a flexible polymer we find that the polymer fills the gel pores via multiple "herniation" processes, whereas for a semi-flexible chain in a tight gel there are no hernias and the polymer follows a smooth curvilinear path. Moreover, for the case of a semi-flexible polymer the gel makes the translocation process more uniform by reducing the acceleration at the end of the process.

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Date submitted: 14 Nov 2014

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