Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Size Interplay between Polymer and Nanopores for the Band Broadening of SEC[1] IAN WEISS, POSTECH/Rensselear Polytechnic Institute, CHANG YEOL RYU, Rensselear Polytechnic Institute, TAIHYUN CHANG, POSTECH — The size interplay between polymer chains and nanopores plays a key role in governing the retention time of polymer chains in liquid chromatography. These nanopores also contribute to the band broadening of the resulting peaks seen in most liquid chromatography systems including size exclusion chromatography (SEC). We have studied how the relationship between the size of the nanopores and the hydrodynamic radius of the polymers affects the band broadening during SEC. This related to Brown random motion of polymer chains in solution, whose motions are restricted by the presence of nanoporous stationary phase for the SEC. We have prepared model polystyrene samples with extremely narrow polydispersity (PDI $<$ 1.0001) using temperature gradient interaction chromatography. Those model samples allow us to directly measure the band broadening of SEC using different size pore columns at various solvent conditions.

[1]NSF OISE PIRE 0730243

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Date submitted: 15 Nov 2011 Electronic form version 1.4