

**North Carolina Section of the American Chemical Society
ACS Polymer Discussion Group**



Thursday November 9, 2006

University Club: North Carolina State University

*Social Hour: 5:30 PM

**Dinner: 6:00 PM

Program: 7:00 PM

THE NANOTHREADING OF POLYMERS

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ABSTRACT

When guest polymers are threaded by host cyclodextrins (CDs) to form crystalline inclusion compounds (ICs), the included polymer chains are highly extended and separated from neighboring chains. This is a consequence of the stacking of the cyclic oligosaccharides, α -, β -, or γ -CD containing 6, 7, or 8 glucose units, respectively, which produces continuous narrow channels ($\sim 0.5 - 1.0$ nm diameters) where the guest polymers are included and confined. Observations that illuminate several important aspects of the nanothreading of polymers to form polymer-CD-ICs are described. This will include i.) the competitive CD threading of polymers with different chemical structures and molecular weights from their solutions containing suspended solid or dissolved CDs, ii.) the threading and insertion of undiluted liquid polymers into solid CDs, and iii.) suspension of polymer A-CD-IC crystals in a solution of polymer B and observation of the transfer of polymer B from solution to replace polymer A and form polymer B-CD-ICs, without dissolution of the CDs. In addition, we report observations of polyolefins adsorbed on zeolites, where we believe the adsorbed polyolefin chains actually thread and are absorbed into the interiors of the zeolite nano-pores, rather than adsorbed on the zeolite surfaces.

* Social hour will consist of a cash bar.

** Contact Russell Gorga at (919) 515-6553 or regorga@ncsu.edu (email preferred) for dinner reservations by noon on Wednesday November 8, 2006, to guarantee a reservation for dinner. If you are unable to make a reservation by that time, check with Russell regarding the availability of places. Dinner is \$15 for Members and \$8 for students. Reservations are *not* required to attend the seminar without dinner.