

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Dynamics of Cyclic Molecules Threaded into a Linear Polymer Chain** KOICHI MAYUMI, HITOSHI ENDO, The University of Tokyo, MICHIO NAGAO, Indiana University and National Institute of Standards and Technology, NOBORU OSAKA, HIDEAKI YOKOYAMA, MITSUHIRO SHIBAYAMA, KOHZO ITO, The University of Tokyo — Dynamics of polyrotaxane (PR), in which cyclic molecules, cyclodextrins (CDs), are threaded on an axis linear polymer chain, poly(ethylene glycol) (PEG), are first studied by contrast variation neutron spin echo (CV-NSE). By comparing PRs of hydrogenated and deuterated PEG with different scattering contrasts, we successfully extract two diffusive modes of CDs, corresponding to self diffusion and relative motion to the axis PEG in PR. The self-diffusion constant of CD in PR is determined to be about one-third of the free one in the absence of the axis polymer, which would reflect the space dimension of diffusion with the topological restriction on the axis chain path.

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Date submitted: 21 Nov 2008

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