

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Probing Chain Entanglement in Polymer Glasses in Sub-nano Level¹ GI XUE, XIAOLIANG WANG, DONGSHAN ZHOU, Department of Polymer Science and Engineering, Nanjing University, PINCHUAN SUN, College of Chemistry, Nankai University — A new approach to characterize the chain distance of polymer glasses in isotopic blends using a dipolar filter NMR experiment was developed using ultra fast magic angle spinning (MAS) to selectively enhance sensitivity and resolution of the signals corresponding to the entanglement region. When the deuterated chain entangles with the hydrogenous one within 0.8 nm, the strong ¹H dipolar interaction will be diluted. Ultra fast MAS (25-kHz) is used to further average the residual dipolar interaction in the entanglement region. And a dipolar filter experiment is used to suppress the signals from strong ¹H-¹H dipolar interactions that exist in hydrogenated polymer chains. Based on the above three aspects, an unique ¹H signal enhancement effect was found selectively in the overlapping region where the distance between two chains is shorter than 0.8 nm, which can be used as a sensitive probe to characterizing the entanglements in sub-nano level.

¹This work is supported by the National Nature Science Foundation of China (NNSFC, Nos. 50533020, 20504014, 90403013, 20374027)

Gi Xue
Department of Polymer Science and Engineering, Nanjing University

Date submitted: 18 Oct 2006

Electronic form version 1.4