Depletion Effect on Self-Organization of atactic Polymer Chain Segments in Microcells\textsuperscript{1} ZHAOQU WANG, Department of Polymer Science and Engineering, Nanjing University, KAIYI LIU, BO CHE, GI XUE — Glass transitions for atactic polystyrene and poly(methyl methacrylate) prepared in nano-cells by microemulsion polymerization in the presence of non-solvents were measured by DSC experiments. An increase in $T_g$ was observed for these polymers. The first DSC scan for the virgin polymers indicated $T_g$ at 112 $^\circ$C and 138 $^\circ$C for $\alpha$-PS and $\alpha$-PMMA, respectively. While the re-precipitated samples show $T_g$ at 105 $^\circ$C and 125 $^\circ$C, respectively. Solid-state NMR relaxation and wide angle X-ray diffraction experiments indicated that the virgin polymer powders were in compact and partially self-organized states. The re-precipitated $\alpha$-PS and $\alpha$-PMMA did not show any self-organization under the same experimental conditions, although there are no changes in molecular weight or tacticity of the polymer chains. A depletion-interaction phenomenon was understood to provide entropic force for the self-organization of polymer chains inside the walls of the microemulsion cells during polymerization.

\textsuperscript{1}Project was supported by NNSFC (No. 9020516 and No. 20374027)

Zhaoqu Wang
Department of Polymer Science and Engineering, Nanjing University