

Abstract Submitted
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Methyl Methacrylate Polymerization in Nanoporous Matrix: Reactivity and Molecular Weight HAOYU ZHAO, SINDEE SIMON, Texas Tech University — The influence of nanoconfinement on the free radical polymerization of methyl methacrylate is investigated. Nanoporous controlled pore glass (CPG) is used as a nanoconfining matrix for the polymerization. The reaction is followed by measuring heat flow as a function of reaction time during isothermal polymerization using differential scanning calorimetry (DSC). Preliminary results indicate several interesting effects for polymerization in 110 nm diameter pores: the induction time increases under nanoconfinement, the effective reaction rate constant increases, the effective activation energy is unchanged, and the gel effect or autoacceleration occurs at earlier times after induction. The latter result concerning the gel effect is presumably due to the decrease in diffusivity under nanoconfinement which results in a decrease in the termination rate of free radicals. The cause of the longer induction times and accelerated reaction rates just after induction are under investigation. The influence of nanoconfinement on molecular weight will also be examined.

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