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**Equilibrium Polymerization of Butyl Methacrylate in Bulk and in Nanopore Confinement** QIAN TIAN, SINDEE SIMON, Texas Tech University — The equilibrium between monomer and polymer in free radical polymerization can be shifted towards monomer under nanoconfinement. This decrease in ceiling temperature is due to a decrease in the entropy associated with the constrained polymer chains, resulting in a larger negative change in entropy of reaction. Here, we investigate the equilibrium polymerization of butyl methacrylate (BMA) in bulk and in nanopore confinement with differential scanning calorimetry (DSC) using di-tert-butyl peroxide (DTBP) as initiator. This system has several advantages compare to the previously studied system of methyl methacrylate (MMA) initiated with 2,2'-azo-bis-isobutyronitrile (AIBN), namely, a reduced rate of reaction, higher boiling point of monomer, and higher initiator utilization temperature range, all of which facilitate the study of the reaction at high temperatures near the ceiling temperature. Interestingly, for BMA, there is no change in limiting conversion between material reacted in bulk and that in controlled pore glass having pore diameters of 7.5 and 50 nm. This unexpected result may be due to the greater flexibility of the PBMA chains compared to PMMA, suggesting that in the BMA/PBMA system, the degree of confinement is relatively low. Future studies will continue to investigate how the entropy change on reaction is affected by confinement.

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