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Modeling of Free Radical Polymerization of Methyl Methacrylate (MMA) in Nanoporous Confinement FATEMA BEGUM, SINDEE SIMON —

Nanoconfinement of methyl methacrylate free radical polymerization is known to impact the molecular weight and molecular weight distribution of the polymer produced, and the results in the literature generally indicate an increase in molecular weight and a concomitant decrease in polydispersity index. In the present work, the mathematical model described by Verros et al. (2005) for free radical bulk polymerization of methyl methacrylate is extended to account for polymerization in nanopores. The model of Verros et al. (2005) incorporates diffusion effects and is capable of describing the conversion and the number- and weight-average molecular weights of the resulting poly(methyl methacrylate) as a function of polymerization time and process conditions. The model is extended by incorporating the effect of nanoconfinement on diffusivity using the scaling reported in the literature. The results indicate that nanoconfinement will lead to higher molecular weights, lower polydispersity, and the gel effect occurs earlier. The results are compared to experimental work and implications discussed.

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