

Abstract Submitted
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Nanoconfinement Effect on Polymerization MAITRI VADDEY, SINDEE SIMON — Ring-opening metathesis polymerization of endo-dicyclopentadiene (DCPD) with second generation Grubbs catalyst is carried out under nanoscale constraint. Differential scanning calorimetry is used to study the polymerization reaction both in the bulk and in the nanopores of controlled pore glass as a function of heating rate; the T_g of the resulting reaction product is also determined. In 110 nm-diameter pores, DCPD undergoes incomplete polymerization followed by the reverse Diels-Alder reaction to form pentadiene. Decreasing the heating rate shifts both reactions towards lower temperatures but does not avert the side reaction. In the bulk unconfined case, the reverse Diels-Alder reaction only occurs in the absence of catalyst. The glass transition temperature of the nanoconfined polymerization product is 164 °C, approximately 20 °C higher than the polymer prepared under bulk conditions. Reaction kinetics in bulk and nanoconfined cases will also be discussed.

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