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Surface Chemistry Effects on the Reactivity and Properties of Nanoconfined Bisphenol M Dicyanate Ester in Controlled Pore Glass[1]
SINDEE SIMON, QINGXIU LI, Department of Chemical Engineering, Texas Tech University — The influence of nanoconfinement on the cure kinetics and glass transition temperature of a bisphenol M dicyanate ester/polycyanurate material is investigated as a function of surface chemistry and nanoconfinement size in controlled pore glass (CPG). The glass transition temperature and conversion as a function of cure time is investigated using differential scanning calorimetry. The native CPG surface accelerates the cure of bisphenol M dicyanate to a larger extent compared to the silanized hydrophobic CPG presumably because of the catalytic nature of surface hydroxyl groups of the native pores. Two T_gs are observed for both monomer and polycyanurates confined in the native CPGs. For the fully cured polycyanurate, the primary T_g is depressed by 60 K at 11.5 nm, and the secondary T_g is 10 to 33 K above the primary T_g. The length scale associated with the secondary T_g is approximately 0.8 nm. Based on the measurements of both T_g and sol content as a function of conversion, the network structure does not change upon nanoconfinement.

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