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**Solution and Melt Rheology of Polypropylene Comb and Star Polymers** ARNAV GHOSH, RALPH H. COLBY, Department of Materials Science and Engineering, Penn State University, JEFFREY M. ROSE, ANNA E. CHERIAN, GEOFFREY W. COATES, Department of Chemistry, Cornell University — Syndiotactic polypropylene macromonomer arms have been prepared by coordination-insertion polymerization. These arms have been made into polypropylene star polymers by the homopolymerization of the syndiotactic arms with a living alkene polymerization catalyst. The macromonomer arms have also been randomly copolymerized with propylene using rac-dimethylsilyl(2-methyl-4-phenylindenyl) zirconium dichloride catalysts to make polypropylene combs. Consequently we have star polymers and a series of comb polymers with different backbone lengths that are all made from the same macromonomer arms. We compare linear viscoelastic data on star and comb polypropylene melts and solutions in squalane to predictions of the tube dilation model and the tube model without tube dilation. The ratio of comb terminal relaxation time to star terminal relaxation time eliminates the friction coefficient and allows determination of the extent of tube dilation the backbone experiences when it relaxes. The concentration dependence of the comb/star terminal relaxation time ratio can be described by either model, owing to adjustable parameters that are not known *apriori*, so independent means to evaluate those parameters will be discussed.

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