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Structure and properties of poly(methyl methacrylate) (PMMA)-fullerene (C_{60}) nanocomposites JAMIE KROPKA, Department of Chemical Engineering, The University of Texas at Austin, PETER GREEN, Department of Material Science and Engineering, Applied Physics, Macromolecular Science and Engineering, University of Michigan — We examined the rheological and dynamical mechanical (DMA) properties of PMMA-C_{60} nanocomposite materials with relatively low concentrations of C_{60}, 0.1-5wt%. Decreases of the glass transition temperature (T_g), $\sim$7 ^{o}C, were observed in samples with 0.5 and 1 wt% C_{60}. The decreases in T_g are connected to decreases of the longest relaxation time measured for the system. The plateau modulus of the composites was enhanced relative to the homopolymer but did not increase monotonically with C_{60} concentration. The relative changes of the relaxation time, the plateau modulus and T_g cannot be explained by the Doi-Edwards model and appear to be connected to the distribution of the nanoparticles, as determined by electron microscopy.

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