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Self-Assembly and Relaxation Behavior of Graphene Containing Acrylic Triblock Copolymer Gels MAHLA ZABET, SEYEDMEYSAM HASHEMNEJAD, SANTANU KUNDU, Dave C. Swalm School of Chemical Engineering, Mississippi State University, MS State, MS — Investigation of gel mechanical properties as a function of their structure is a significant research interest. This study presents the effect of graphene (or few-layer graphene) on the self-assembly and the relaxation behavior of a thermoreversible gel consists of a physically crosslinked poly (methyl methacrylate)-poly (n-butyl acrylate)-poly (methyl methacrylate) [PMMA-PnBA-PMMA] triblock copolymer in 2-ethyl-1-hexanol, a midblock selective solvent. Graphene was obtained by sonicating exfoliated graphite in 2-ethyl-1-hexanol at various concentrations. Filtration technique and spectrophotometry were utilized to measure the graphene concentration in the dispersions. The dispersed graphene was then incorporated in a series of gels and the effect of graphene on mechanical properties, including the relaxation behavior were studied. Small angle X-ray scattering (SAXS) was used to investigate the microstructure of these gels at room temperature. SAXS data were analyzed to estimate the number of end blocks per junction zone, the average spacing between the junctions, and the change of these properties as a function of graphene concentration. The results indicate that the presence of graphene affects the self-assembly process.

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