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The Effect of Illumination on the Gelation Process of Optoelectronic Materials BRIAN MORGAN, MARK DADMUN, University of Tennessee — A tremendous amount of insight into the functionality of conjugated polymers in optoelectronic devices can be gained by the study of these materials as they progress through the gelation process. The nature of the percolated network structures formed directly affects exciton transport and device efficiency, thus precise knowledge of the evolution of structures provides crucial information towards improving device efficiency via processing techniques. Additionally, select optoelectronic polymers have exhibited reversibly altered physical properties such as viscosity upon exposure to white light, potentially indicative of temporary conformation changes. We have conducted a series of small angle neutron scattering experiments to probe the temperature-driven gelation process of the conjugated photoactive polymer poly(3-hexylthiophene-2,5-diyl) (P3HT) in both the presence and complete absence of white light. Fitting the resultant data indicates the creation and steady growth of cylindrical aggregates formed by the agglomeration of free chain P3HT as the growth process. Furthermore, clear differences between illuminated and non-illuminated gels are observed across multiple length scales, pointing towards an optically-induced variation in the gelation process.

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