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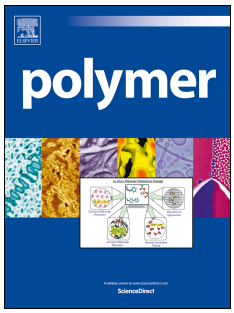

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Illumination Alters the Structure of Gels Formed from the Model Optoelectronic Material P3HT

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Abstract

Studying the gelation process of conjugated optoelectronic polymers has often been employed as a means of better understanding the final morphology and assembly in active layers of organic electronic devices due to the correlation between the experimentally observed sol-gel transition and many common solution based fabrication techniques. The nature of the percolated network structures formed through the molecular assembly that occurs during this gelation directly affects device performance in conjugated polymer based active layers. Thus, precise knowledge of the evolution of structures during gelation provides crucial information that is needed to rationally improve device performance by directing the assembly during processing. Additionally, observing the effects of environmental factors such as ambient light exposure upon the gelation process will direct efforts towards improving universally overlooked facets of the typical fabrication procedure. Thus, we have conducted a series of ultra small angle and 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 absence of white light. Analysis of the resultant scattering data shows that the gelation