

Kinetic Analysis of Grignard Metathesis Polymerization of Poly(3-hexylthiophene)

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Presented at
Southern BioProducts and Renewable Energy Conference
May 20-21, 2009
Jackson, MS, USA

Poly(3-hexylthiophene) (P3HT) has been the focus of many research groups in the area of organic photovoltaics (OPVs). P3HT is an inherently conductive polymer that exhibits excellent thermal and environmental stability while maintaining good conductivities (3.4×10^{-4} to 1.0×10^{-1} S/cm). Post-polymerization reactions are required in order to achieve the maximum theoretical efficiencies. It is therefore critical to understand the mechanism and kinetics of the P3HT polymerization. This study outlines the synthesis and characterization of P3HT by Grignard Metathesis (GRIM). Kinetic studies on monomer conversion, molecular weight, and end group analysis, which are necessary to verify the mechanism of polymerization will be presented.