

Abstract Submitted
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An investigation of the photovoltaic properties of poly-(3-alkylthiophene):fullerene bulk heterojunction solar cells ANNA A. BELAK, Virginia Polytechnic Institute and State University, MICHAEL W. ROWELL, SHAWN R. SCULLY, MICHAEL D. MCGEHEE, Stanford University — Poly-(3-hexylthiophene) has been the premier semiconducting polymer material for use in organic photovoltaic and transistor devices for some time. Its strong regioregularity yields relatively large crystal domains and a high charge carrier mobility. Some possible limitations in these solar cells are light absorption and hole collection through the polymer matrix. The alkyl side chains may decrease the optical density of the material and interfere with charge transport between polymer chains. We focused our investigation on the use of polythiophene derivatives with side chains of different lengths, poly-(3-hexylthiophene) and poly-(3-butylthiophene), in polymer/fullerene blend cells. We found that P3HT solar cells are most efficient, but P3BT cells are also promising, and their performance could be improved with further optimization.

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