

Abstract Submitted  
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**Cooperative Assembly of Hydrogen-bonded Block Copolythiophenes/Fullerene Blends for Photovoltaic Devices**<sup>1</sup> JAMES J. WATKINS, YING LIN, JUNG AH LIM, QINGSHUO WEI, ALEJANDRO L. BRISENO, Polymer Science and Engineering Department, University of Massachusetts Amherst — The current work provides a general approach to obtain reliable donor acceptor morphologies by H-bonding cooperative assembly and to achieve efficient photovoltaic devices with enhanced device stability. Herein, we utilize P3HT-based block copolymer (BCP), in which one block is P3HT and the other block is a P3HT derivative containing a poly(ethylene oxide) (PEO) oligomer side chain. This design both enables self-assembly of the devices via microphase segregation into lamellar, cylindrical or spherical morphologies depending on the relative volume fractions of the blocks and provides a means for establishing strong preferential interaction between fullerene derivatives containing hydrogen bond donating groups (such as COOH groups) and the PEO side chain. One advantage of this approach is excellent device stability due to the suppression of macrophase separation resulting from fullerene crystallization under harsh annealing condition.

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