

Abstract Submitted  
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**Facile Control of a Wide Range of Regioregularity: Significant Influence on Mechanical and Electrical Properties of Conjugated Polymers** JIN-SEONG KIM, JAE-HAN KIM, WONHO LEE, KAIST, HOJEONG YU, POSTECH, HYEONG JUN KIM, KAIST, INHO SONG, JOON HAK OH, POSTECH, TAEK-SOO KIM, BUMJOON KIM, KAIST, POSTECH COLLABORATION — While regioregularity (RR) has been known to have a strong influence on inherent properties of conjugated polymer, systematic study of RR has been limited due to the lack of synthetic methodology. Herein, we prepared a series of poly(3-hexyphthiophenes) (P3HTs) having a wide range of RR from 64 to 98% by the modified Grignard metathesis method that utilizes the dimer moiety. We observed that the RR determines crystalline behavior, mechanical and electrical properties of P3HT. Although higher RR P3HT had higher hole mobility, its increased degree of crystallinity induced fragile nature of polymers (elongation break <1%). In contrast, lower RR had lower elastic modulus and thereby leading to significant reduction of fragility. Therefore, our finding suggested that the control of RR is critical to regulate the properties of conjugated polymers between electrical performance and mechanical resilience as depending on the purpose of the applications. (i.e flexible portable devices vs high performance panel)

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