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Over 10% Efficiency in Single-Junction Polymer Solar Cells Developed from Easily Accessible Random Terpolymers

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Abstract

Despite the numerous random polymers recently developed for polymer solar cells (PSCs), very limited attention has been directed toward controlling the ratio of widely used thiophene (T) to bithiophene (2T) chromophores in their backbones. Herein, we developed a new family of thieno[2',3':5',6']pyrido[3,4-g]thieno[3,2-c]isoquinoline-5,11(4*H*,10*H*)-dione-based random terpolymers containing different T and 2T compositions. In-depth structure–property investigations covering physical properties, morphology, and PSC performance with respect to T:2T in the polymers were performed by several structural characterization techniques. Over a range of compositions, these random terpolymers provide impressive fill factor (FF)

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