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High-Performance All-Polymer Solar Cells Based on Face-on Stacked Polymer Blends with Low Interfacial Tension BUMJOON KIM, HYUNBUM KANG, CHANGYEON LEE, TAESU KIM, KAIST — We report highly-efficient all-polymer solar cells with power conversion efficiencies of over 4.5% by highly-intermixed blends of poly[4,8-bis(5-(2-ethylhexyl)thiophen-2-yl)benzo[1,2-*b*:4,5-*b*']dithiophene-*alt*-3-fluorothieno[3,4-*b*]thiophene-2-carboxylate] (PTB7-Th) donor and poly[[N,N'-bis(2-octyldodecyl)-napthalene-1,4,5,8-bis(dicarboximide)-2,6-diyl]-*alt*-5,5'-(2,2'-bithiophene)] P(NDI2OD-T2) acceptor polymers. The low interfacial tension and the face-on π-π stackings of the all-polymer blends afforded desired nanophase morphology, which facilitates efficient charge transport from active layer to each electrode. In addition, the incorporation of 1,8-diiodooctane additives was able to tune the degree of crystallinity and orientation of P(NDI2OD-T2) acceptors, resulting in remarkable enhancement of electron mobility, external quantum efficiency and J_{SC} values.

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