

Both Highly Efficient and Mechanically Robust Polymer Solar Cells with Polymer Acceptor Additive Incorporation
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이진우, 마부수, 김택수, 김범준[†]

KAIST

(bjkim02@kaist.ac.kr[†])

The authors report an polymer solar cell (PSC) system with 10% of power conversion efficiencies (PCEs) and 30% of the entire device stretchability, by employing high molecular weight (MW) polymer acceptor (P_A) additives into highly efficient PSC system. Intiguingly, the binary PSC system showed ultra-high PCE of 15.42% without P_A additive, and the PCE is maintained up to 13.97% with incorporating 30% of the additive in the PSC fabrication. We note the engineering crack onset strain (COS) sharply increases with loading of the P_A additives, showing 6-fold increase from 2.21 at the blend without the additive to 11.93% with 30% of the P_A loading. We revealed both the PCE maintenance and the skyrocketed mechanical robustness with loading of the P_A additive are mainly attributed to the formation of chain entanglement and tie molecules due to long P_A chains. Our works firstly develop and report the FS-PSC system with both extremely high PCE and stretchability by incorporation of P_A additive, which takes a step closer to real commercialization of wearable power generators in the near future.