

Organic π -conjugated chromophore with furan spacer for solution-processed small molecule organic solar cells

모호드 나집, Sadia Ameen, 송민우, 박두리, 서형기, 신형식†

전북대학교

(hsshin@jbnu.ac.kr†)

A novel thiazolo[5,4-d]thiazole-core organic chromophore (RFTzR) was synthesized and applied as electron-donor material for solution-processed small molecule organic solar cells (SMOSCs). The molecule has showed a good thermal stability of >350 with self-assembly behavior. RFTzR exhibited good oxidation stability with HOMO and LUMO energy levels of -5.36 eV and -3.14 eV, respectively. The blended thin film of RFTzR:PC₆₀BM (2:1, w/w) exhibits homogeneous and smooth morphology of low surface roughness ($R_{rms}=1.94$ nm) with nanoscale phase separation in chlorobenzene solvent. The fabricated cells of RFTzR (donor) and PC60BM (acceptor) as photoactive materials showed relatively smooth thin film morphology of devices which gives a maximum PCE of 2.72% (RFTzR:PC₆₀BM, 2:1, w/w) optimized ratio with good open-circuit voltage of 0.756 V and high photocurrent density of 10.13 mA/cm². The present study makes a way for the furan-bridged organic chromophores in small molecule organic solar cells.