

Benzothiadiazole with π -spacer as efficient chromophore for bulk heterojunction organic solar cells

피자히라미야, 신형식[†], 사디아 아민, 압둘라, 김은비, 장광수, 알람샤바즈
전북대학교
(hsshin@jbnu.ac.kr[†])

This work illustrates the synthesis of donor- π -acceptor- π -donor (D- π -A- π -D) type chromophore (4,7-Bis[2-(3,5-dimethoxyphenyl) ethenyl]-2,1,3-benzothiadiazole, containing 2,1,3-benzothiadiazole as the electron-withdrawing core and dimethoxyphenyl as electron-donating terminal groups via Suzuki cross-coupling reaction. The presence of the ethylene moiety as a polyvalent spacer to expand the π -electron system in BTz(OMe)₂ chromophore improved the optical and structural properties. The synthesized BTz(OMe)₂ exhibited suitable HOMO and LUMO values of -5.39 eV and -3.56 eV, respectively according to cyclic voltammetry and the optical absorption onset. With BTz(OMe)₂:PC61BM (1:4, w/w) blend thin film, a highest power conversion efficiency (PCE) of ~1.98 %, the short circuit current (J_{sc}) of ~10.46 mA/cm² with an open-circuit voltage (V_{oc}) of ~ 0.622 V were achieved. The obtained results favored BTz(OMe)₂ chromophore as a promising donor material for the performance BHJ-OSCs.