

## Synthesis of new benzothiadiazole based small molecules for the fabrication of organic solar cell

피자히라미야, 신형식<sup>†</sup>, 사디아, 나 짐, 압둘라, 사바즈  
전북대학교  
(hsshin@jbnu.ac.kr<sup>†</sup>)

In this work, a new organic chromophore of donor-acceptor-donor (D-A-D) type containing 2,1,3-benzothiadiazole as the electron-withdrawing core and dimethoxyphenyl as electron-donating terminal groups (OMeBTD) was synthesized using palladium-catalyzed suzuki coupling reactions for the efficient solution-processed bulk-heterojunction (BHJ) small molecule organic solar cells (SMOSCs). The synthesized OMeBTD exhibited good optical parameters and suitable HOMO/LUMO values of -5.73 eV and -3.14 eV, respectively. The fabricated SMOSCs of configuration ITO/PEDOT:PSS/OMeBTD:PC60BM (1:4, w/w)/Au showed a power conversion efficiency (PCE) of ~1.98% with the short circuit current ( $J_{SC}$ ) of ~10.46 mA/cm<sup>2</sup> and the open-circuit voltage ( $V_{OC}$ ) of ~0.622V. The reasonable  $J_{SC}$  and  $V_{OC}$  of the devices might be attributed to promising absorption, emission as well as the electrochemical properties due to the presence of benzothiadiazole as strong electron-withdrawing and dimethoxyphenyl unit as electron-acceptor.