



Small D-pi-A Systems with o-Phenylene-Bridged Accepting Units as Active Materials for Organic Photovoltaics

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Résumé en anglais	<p>Donor-acceptor (D-A) systems that combine triarylamine donor blocks and dicyanovinyl (DCV) acceptor groups have been synthesized. Starting from the triphenylamine (TPA)thiopheneDCV compound (1) as a reference system, various synthetic approaches have been developed for controlling the light-harvesting properties and energy levels of the frontier orbitals in this molecule. Thus, the introduction of methoxy groups onto TPA, the replacement of one phenyl ring of TPA by a thiophene ring, or the extension of the -conjugating spacer group lead to the modulation of the HOMO level. On the other hand, the fusion of the DCV group onto the vicinal thiophene ring by an ortho-phenylene bridge allows for a specific fine-tuning of the LUMO level. The electronic properties of the molecules were analyzed by using UV/Vis spectroscopy and cyclic voltammetry and the compounds were evaluated as donor materials in basic bilayer planar heterojunction solar cells by using C-60 as acceptor material. The relationships between the electronic properties of the donors and the performance of the corresponding photovoltaic devices are discussed. Bilayer planar heterojunction solar cells that used reference compound 1 and C-70 afforded power-conversion efficiencies of up to 3.7%.</p>
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