



Manipulation of the Open-Circuit Voltage of Organic Solar Cells by Desymmetrization of the Structure of Acceptor-Donor-Acceptor Molecules

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Auteur	Demeter, Dora [1], Rousseau, Theodulf [2], Leriche, Philippe [3], Cauchy, Thomas [4], Po, Riccardo [5], Roncali, Jean [6]
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Résumé en anglais	<p>The synthesis of acceptordonoracceptor (ADA) molecules based on a septithiophene chain with terminal electron acceptor groups is reported. Using a dicyanovinyl-(DCV) substituted molecule as reference, another symmetrical ADA donor containing thiobarbituric (TB) groups is synthesized and these two acceptor groups are combined to produce the unsymmetrical ADA compound. The electronic properties of the donors are analyzed by cyclic voltammetry and UV-Vis absorption spectroscopy and their photovoltaic properties are characterized on bilayer planar heterojunction cells that include spun-cast donor films and vacuum-deposited C60 as acceptor. Optical and electrochemical data show that replacement of DCV by TB leads to a small increase of the HOMO level and to a larger decrease of the LUMO, which result in a reduced band-gap. The desymmetrized compound presents the lowest oxidation potential in solution but the highest oxidation onset in the solid state, which leads to a significant increase of the open-circuit voltage of the resulting solar cells.</p>
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Liens

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