



Three-dimensional tetra(oligothienyl)silanes as donor material for organic solar cells

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Résumé en anglais	<p>Tetrahedral conjugated systems involving four conjugated oligothiophene chains fixed onto a central silicon node (1, 2) have been synthesized and used as donor materials in hetero-junction solar cells. Bilayer solar cells have been realized by thermal evaporation of compounds 1 and 2 as donors and N,N'-bis-tridecylperylene-dicarboxyimide as an acceptor. Comparison of the performances of these devices to those of a reference system based on dihexylterthienyl (H3T) shows that despite comparable effective conjugation lengths, the 3D compounds 1 and 2 lead to a power conversion efficiency four-five times higher, suggesting better absorption of the incident light and better hole transport properties. Whereas fabrication of bulk hetero-junction with H3T was prevented by the lack of film forming properties, a prototype bulk hetero-junction based on compound 2 as the donor and [6,6]-phenyl-C61-butyric acid methyl ester (PCBM) as the acceptor has been realized. A short-circuit current density of 1.13 mA cm⁻² and a power conversion efficiency of 0.30% has been measured under AM 1.5 simulated solar irradiation at 80 mW cm⁻².</p>
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- [5] <http://okina.univ-angers.fr/jean.roncali/publications>
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