

**(Supra)molecular structures for bulk
heterojunctions**

J.C. Hummelen,¹ M.T. Rispens,¹ L. Sanchez,¹
J.K.J. van Duren,² A. El-ghayoury,²
A.P.H.J. Schenning,² R.A.J. Janssen² and
E.W. Meijer²

¹Stratingh Institute and Materials Science Centre,
University of Groningen
Nijenborgh 4
Groningen 9747 AG
The Netherlands

²Laboratory of Macromolecular and Organic Chemistry,
Eindhoven University of Technology
PO Box 513
Eindhoven 5600 MB
The Netherlands

Molecular bulk-heterojunctions consist of electronic donor and acceptor moieties that can be either mixed randomly, bound covalently, organized (in part) by supramolecular interactions, or combinations thereof. The functionality of the donor-acceptor (composite) material strongly depends on its morphology. Especially in molecular photovoltaic devices, based on the bulk-heterojunction principle, efficient charge separation and charge transport are highly demanding on the mesoscopic structure of the material. We present examples of various types of donor-acceptor materials for bulk-heterojunctions, made of conjugated oligomers or polymers as donors and fullerene derivatives as acceptors, with special emphasis on functional supramolecular building blocks having one or two quadruple hydrogen bonding units. The performance of some of these materials in photovoltaic devices will also be discussed.