

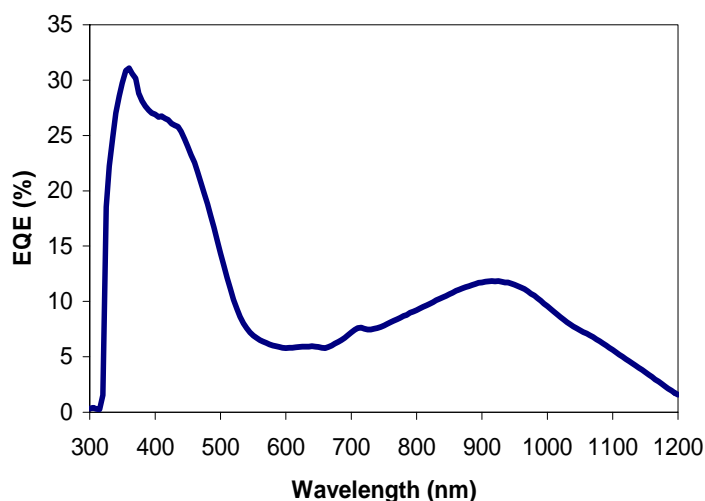
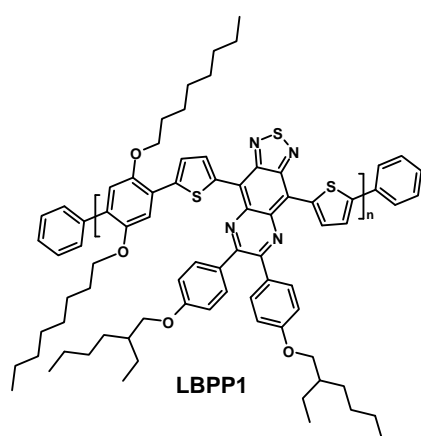
## Design, Synthesis, and Devices of Low Band Gap Conjugated Polymers

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The development of high efficiency polymer solar cells is a challenging research task and our efforts have, during several years, been concentrated on preparing and evaluating new low band gap materials. The polymers in question have been specifically designed to be used together with C60 or C70 derivatives in bulk heterojunction solar cells. We have primarily chosen to work with polyfluorenes and polyphenylenes with extended absorption to cover the important parts of the solar emission. To achieve a low band gap, our strategy has been to prepare alternating copolymers based on planar conjugated segments with internal electron donor-acceptor-donor functions in between the fluorine or the phenylene units. To facilitate the device function the HOMO and LUMO positions of the polymers have been carefully controlled through the design of the polymers. This made it possible for us to create efficient devices of low band gap polymers with high open circuit voltage. Our polymers have also been used to prepare devices with action spectra extending into the IR-region (1200 nm), with potential use in tandem solar cells or in photo detectors, see below.



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