

## Charge Transfer and Recombination of Donor/Acceptor Co-oligomers Based on PeryleneDiimide

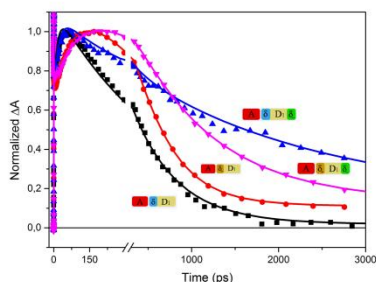
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Effect of donor moiety on charge formation and recombination

Conjugated donor-acceptor block co-oligomers that self-organize into D-A mesomorphic arrays have raised increasing interest due to their potential applications in organic solar cells. Méry and co-workers have designed donor-spacer-acceptor oligomers based on bithiophene-fluorene (D) and perylene diimide (A), recently shown to self-organize to give a mesomorphic lamellar structure at room temperature.<sup>1,2</sup> A series of isolated molecules with different donor moiety is investigated by using femtosecond transient absorption spectroscopy and time-dependent density functional theory combined with the Marcus-Jortner formalism. The 8-times increase of the CT lifetimes is rationalized in terms of a reduced electronic coupling between D and A brought about by the chemical design. The strong solvent dependence of the CT lifetime and previous work on their modifications by the intermolecular interactions in the self-assembled film<sup>3</sup> are prompt for a more comprehensive design approach beyond computational predictions for isolated molecules. The study of smectic LC films is under progress.

1. P. O. Schwartz, L. Biniek, E. Zaborova, B. Heinrich, M. Brinkmann, N. Leclerc and S. Méry, *J Am Chem Soc*, 2014, 136, 5981-5992
2. L. Biniek, P.-O. Schwartz, E. Zaborova, B. Heinrich, N. Leclerc, S. Méry and M. Brinkmann, *J. Mater. Chem. C*, 2015, 3, 3342-3349
3. T. Roland, J. Léonard, G. Hernandez Ramirez, S. Méry, O. Yurchenko, S. Ludwigs and S. Haacke, *Phys. Chem. Chem. Phys.*, 2012, 14, 273-279