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Energy and charge transfer in select organic semiconductor composites ANDREW PLATT, MARK KENDRICK, Oregon State University, JOHN ANTHONY, University of Kentucky, OKSANA OSTROVERKHOVA, Oregon State University — We report on the photophysical properties of high-performance solution-processable functionalized anthradithiophene (ADT) composites. The time-resolved fluorescence and photoconductivity of drop-cast films of a fluorinated derivative, ADT-TES-F, with guest molecules of C_{60}, or another functionalized ADT derivative, ADT-TIPS-CN, are measured after excitation with $\sim$ 100 fs laser pulses and suggest strong charge and energy transfer in ADT-TES-F/C60 and ADT-TES-F/ADT-TIPS-CN composites, respectively. An addition of 2 and 5 wt % of C_{60} to the host resulted in transient photocurrent amplitude enhancement by a factor of 3 and 10, respectively, and a partial quenching of fluorescence. An addition of 0.05% wt of ADT-TIPS-CN guest resulted in strong energy transfer from host to guest, as observed from fluorescence spectral shift, and a change in transient photocurrent dynamics. We summarize these results from our studies involving time-resolved fluorescence and photoconductivity techniques coupled with temperature control to probe the processes responsible.

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