PICOSECOND TIME-RESOLVED STUDIES OF MULTIPLE ENERGY TRANSFER IN CONJUGATED POLYMER NANOPARTICLES

A

Presented to

the Graduate School of

Clemson University

In Partial Fulfillment

of the Requirements for the Degree

Chemistry

by

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Accepted by:

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ABSTRACT

Conjugated polymer nanoparticles (CPNs) are a model system for the study of complex, nanoscale, multichromophoric interactions. In this dissertation, we focus on a systematic investigation of the length scales and rates of energy transport in CPNs in order to optimize conjugated polymers for their uses as active materials in nanostructured, bulk heterojunction organic photovoltaics and LEDs using steady-state and time-resolved fluorescence spectroscopy in conjunction with Monte Carlo simulation methods. We additionally seek to develop brighter, red-emitting CPNs through Förster Resonance Energy Transfer (FRET) for their use in biomedical imaging applications. Analysis of dye-doped and polymer blended CPNs shows that the doped CPNs exhibit bright, red-shifted emission, owing to the highly efficient energy transfer from the host polymer PFBT to the respective dopants (the fluorescent dye perylene red in dye-doped CPNs, and the polymer MEH-PPV in blended CPNs).

ACKNOWLEDGMENTS

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CHAPTER ONE

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APPENDICES

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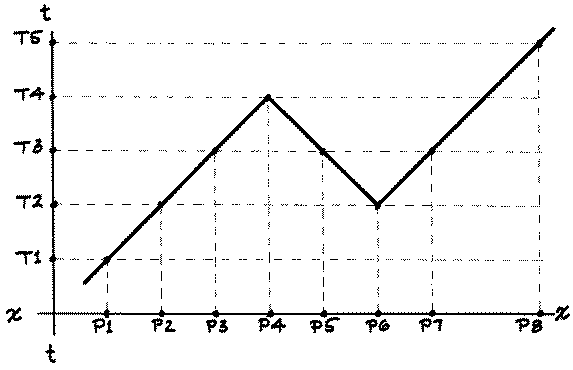


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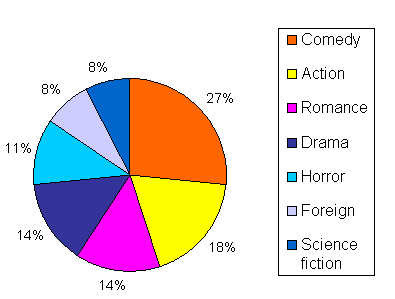


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