

Abstract Submitted  
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**Effects of Aggregation on the Electronic Properties of Polythiophene and its Oligomers** KELLY ZEWE, LINDA PETEANU, WYNEE LEE — Polythiophene is a commonly used component of organic electronics and solar cells. Polythiophene chains are readily aggregated under the processing conditions used to form thin films for applications in devices. This aggregation can drastically alter the charge transfer and optical properties of the material. In order to better understand these effects, oligomers of polythiophene were studied. Because oligomers have shorter, well-defined chain lengths and are free of defects, the effects of aggregation on their electronic properties are easier to interpret than those of the polymer systems and are more readily modeled using electronic structure theory. Bulk and single-molecule fluorescence methods are used to explore the emission properties as a function of aggregate size, precipitating solvent, and monomer properties and to correlate these to the polymer properties. Stark spectroscopy is used to measure the change in charge separation and in excited-state delocalization caused by aggregation and the consequent increase in chain-chain contacts.

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