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Innovative Energy Harvesting Nanostructures for Organic-based Solar Cells HEMALI RATHNAYAKE, Western Kentucky University — Linear conjugated polymers (LCPs) exhibit very complex self-assembly behavior due to their structural flexibility, longer chain length, and wide molecular weight distribution. It is essential to develop LCPs having both improved optoelectronic and organizable self-assembly properties. To improve the progress of organic-based devices, synthetic methods need to be developed to make well-defined three-dimensional structures with a controlled size and shape in conjunction with delicately organized self-assembly properties. Here I will discuss a series of donor- and acceptor-functionalized nanostructures having both improved optoelectronic and well defined self-assembly properties for low-cost, high efficiency, and flexible solar cells. This work will contribute to the fundamental knowledge in this discipline by developing better synthetic methodologies, designing novel hybrid nanostructures, and fabricating low-cost, flexible solar panels. Incorporating linear conjugated polymers to self-guidable three-dimensional structures avoid the formation of micrometer-sized phase segregated domains and improved the photovoltaic parameters of these donor/acceptor systems. Improvements in efficiency are realized by obtaining nanoscale phase separation using these hybrid materials.

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