

Electronic Supplementary Information (ESI)

Photoresponse of a single poly(p-phenylene vinylene)-CdSe bulk-heterojunction submicron fiber

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Detailed preparative procedure for PPV-CdSe fiber:

CdSe nanocrystals were synthesized in alkaline solutions, with thioglycolic acid (TGA) as stabilizer.¹ The prepared nanocrystals was purified and washed five times with 2-propanol and ethyl ether to remove excess TGA, and the products were dried in vacuum. The monomer p-xylene-bis(tetrahydrothiophenium chloride) of PPV was prepared by reaction of dichloro-p-xylene (Aldrich 98%, 5 g) with excess tetrahydrothiophene (Aldrich 98%, 75 ml) at 50 °C in methanol for 12 h.² The product was purified by concentrating the reaction solution and then precipitating the condensed solution in cold acetone (0 °C). The solid was collected by filtration and dried thoroughly in vacuum oven. Then the solid of p-xylene-bis(tetrahydrothiophenium chloride) was mixed with 0.2 g TGA-covered CdSe nanocrystals in 40 ml of methanol. The PPV precursor-CdSe composites were prepared by dropping 40 mL of 0.4 M NaOH solution into above methanol solution under nitrogen atmosphere. The reaction proceeded at 0 °C for 30 min and was terminated by the addition of 0.4 M HCl aqueous solution to neutralize the reaction solution. The prepared PPV precursor-CdSe aqueous solution was dialyzed against deionized water for a week and ethanol for three days. Then, the prepared solution was electrospun into fibers, and subsequently with thermal conversion.

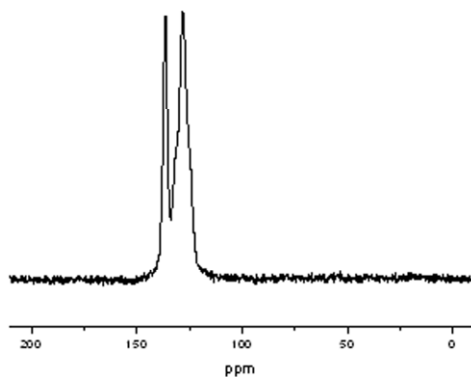


Figure S1. Solid-state MAS ¹³C NMR spectrum of PPV-CdSe fibers.

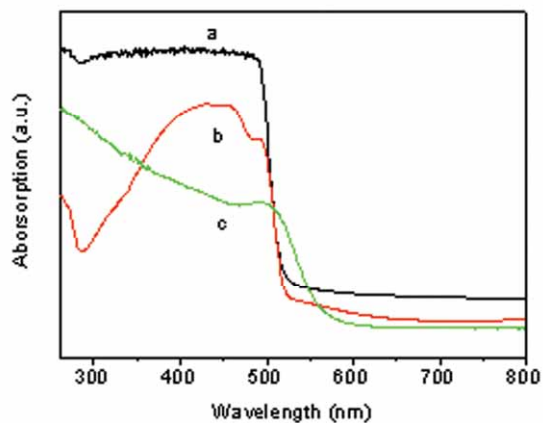


Figure S2. The absorption spectra of (a) PPV-CdSe bulk-heterojunction fibers, (b) PPV fibers, and (c) CdSe Nanocrystals.

References:

1. S. C. Zhang, J. H. Yu, X. G. Li and W. H. Tian, *Nanotechnology*, 2004, **15**, 1108.
2. J. B. Schlenoff and L. J. Wang, *Macromolecules*, 1991, **24**, 6653.