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Electrostatic Layer-by-Layer Assembly of CdSe Nanorod/Polymer Nanocomposite Thin Films

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Table S1. Experimentally determined band gaps of the three NR samples and two photoconductive polymers as determined by both UV-Vis spectroscopy (Eg) and cyclic voltammetry (Eg')

Material	Eg (eV)	Eg' (eV)
NR1	1.96	2.02
NR2	2.07	2.02
NR3	1.77	1.77
PTEBS	2.06	2.03
P3KHT	1.82	1.89

Table S2. Average photovoltaic parameters and standard deviations (in brackets) of the best 5 devices on two chips for the photoactive polythiophenes (PTEBS and P3KHT) and CdSe nanorods assembled through eLBL.

Polythiophene	CdSe NR	η (%)	V_{oc} (V)	FF	J_{sc} (mA/cm^2)
PTEBS	NR1	0.005 (0.003)	0.10 (0.05)	0.26 (0.04)	-0.16 (0.01)
	NR2	0.017 (0.007)	0.37 (0.05)	0.26 (0.01)	-0.17 (0.04)
	NR3	0.03 (0.01)	0.29 (0.03)	0.27 (0.04)	-0.30 (0.06)
P3KHT	NR1	0.05 (0.01)	0.51 (0.08)	0.29 (0.01)	-0.32 (0.03)
	NR2	0.06 (0.01)	0.60 (0.03)	0.28 (0.03)	-0.33 (0.03)

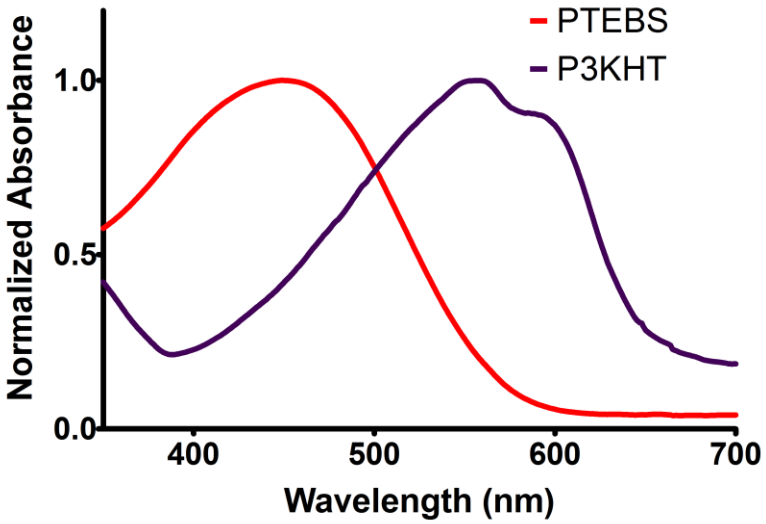


Figure S1. UV-Vis spectra of PTEBS and P3KHT polymers.

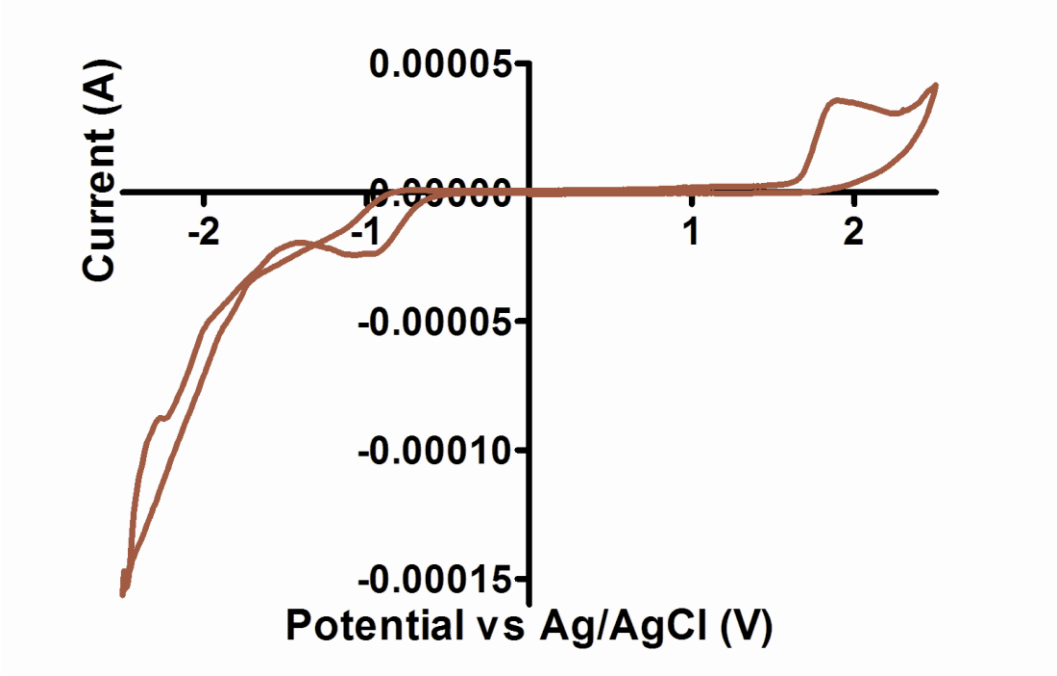


Figure S2. Typical cyclic voltammagram of CdSe nanorods showing the oxidation and reduction peaks corresponding to the valence and conduction band edges respectively.

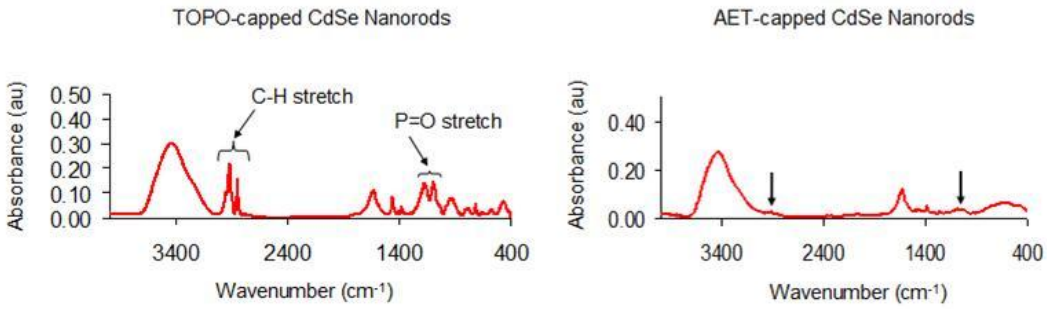


Figure S3. FTIR spectra of TOPO-capped CdSe nanorods and AET-capped CdSe nanorods showing the decrease in characteristic C-H and P=O stretches as expected following the ligand exchange.

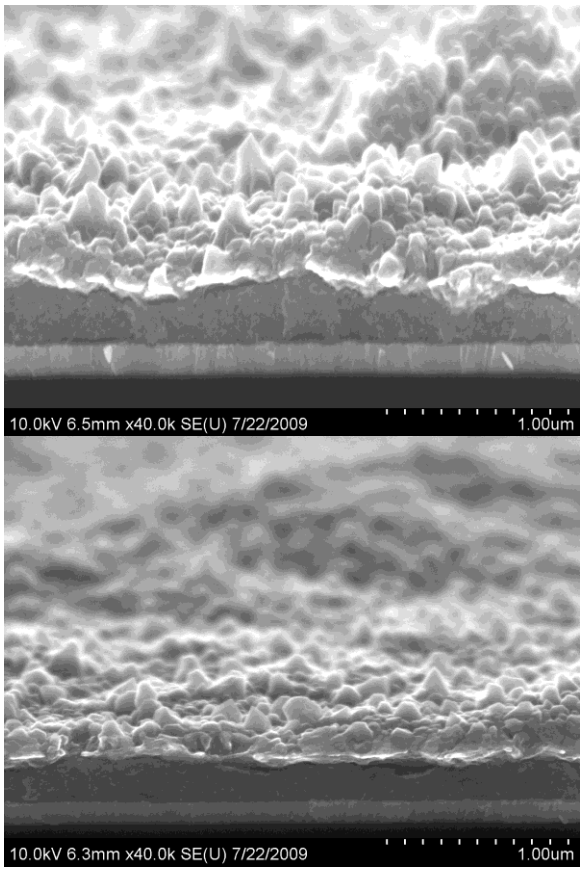
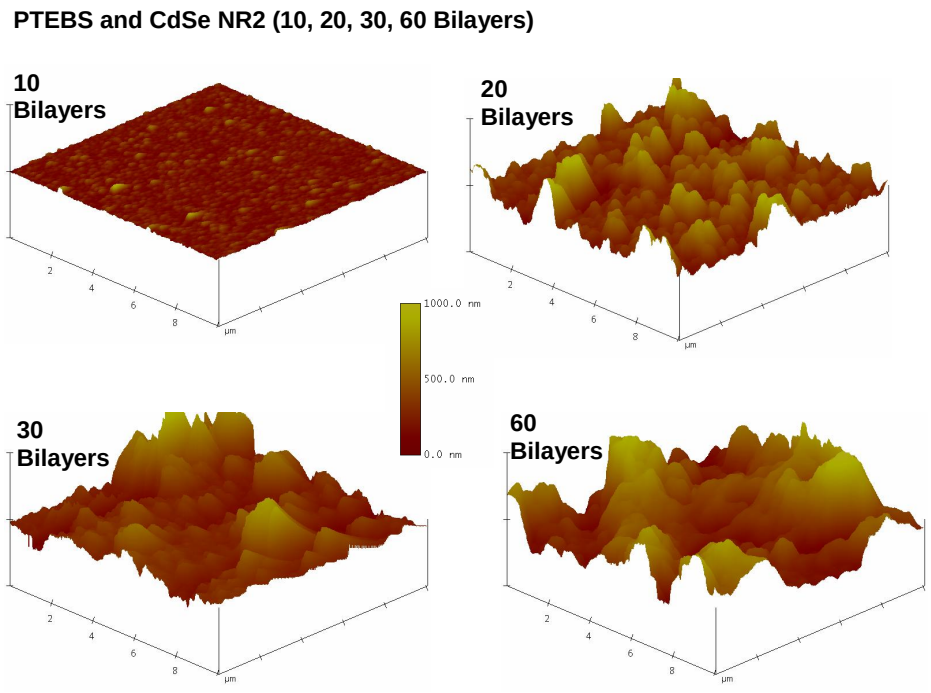


Figure S4. Cross-section SEM of NR1 (250 nm thickness) and NR2 (220 nm thickness) with P3KHT thin films assembled using eLBL

a)



b)

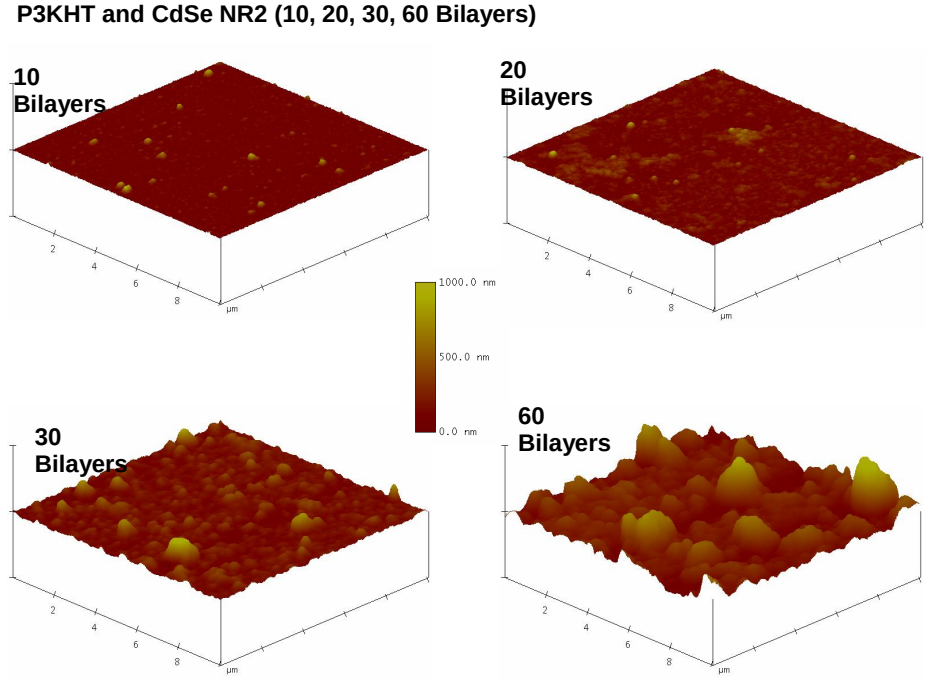


Figure S5. AFM topographic images for 10, 20, 30 and 60 bilayers of a) CdSe nanoparticle/PTEBS) and b) CdSe nanoparticle/P3KHT) nanocomposite thin films.

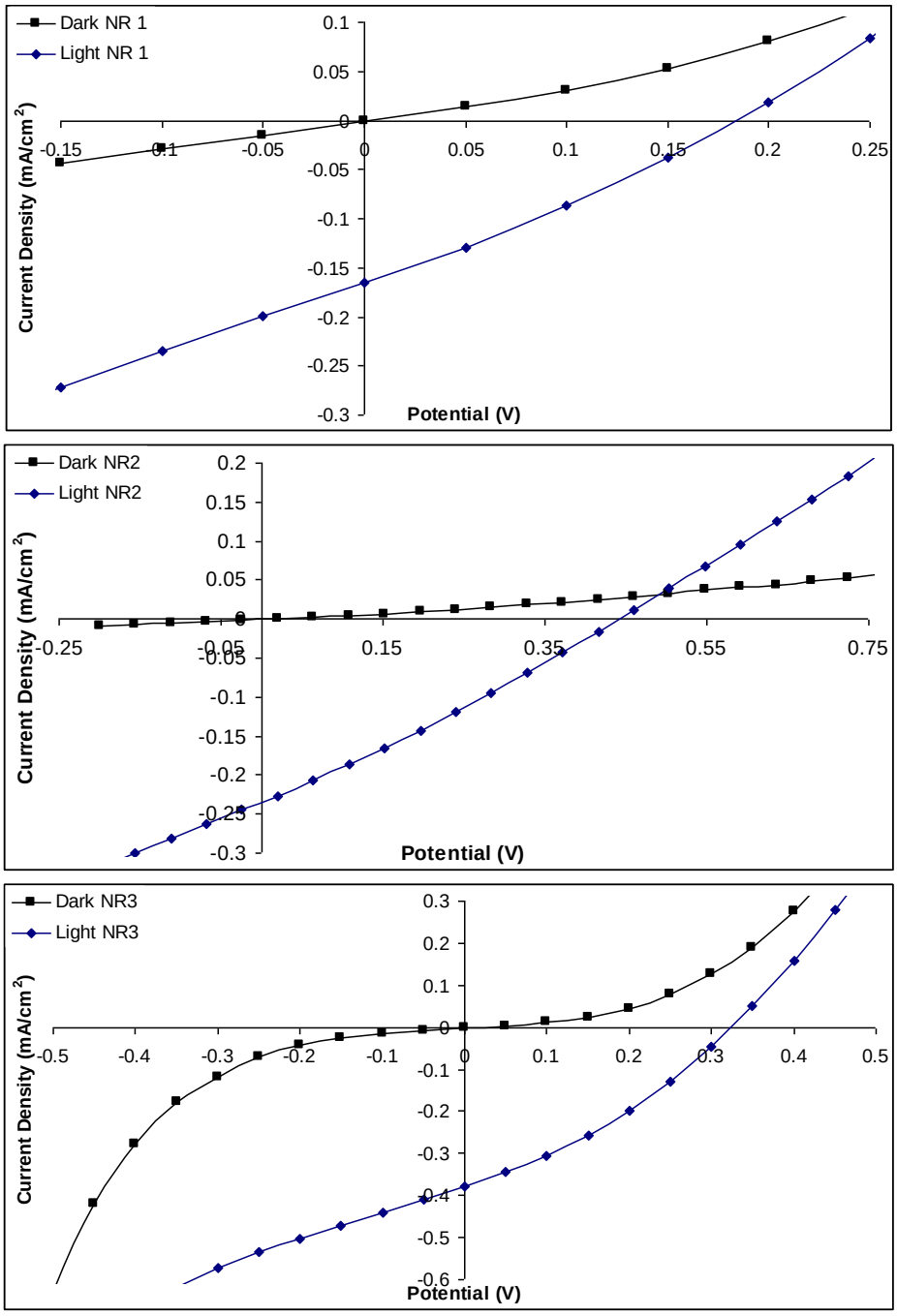


Figure S6. IV-characteristics of solar cells fabricated from PTEBS and NR1, NR2, NR3 including the response in the dark ("Dark") and underAM1.5 illumination ("Light") .

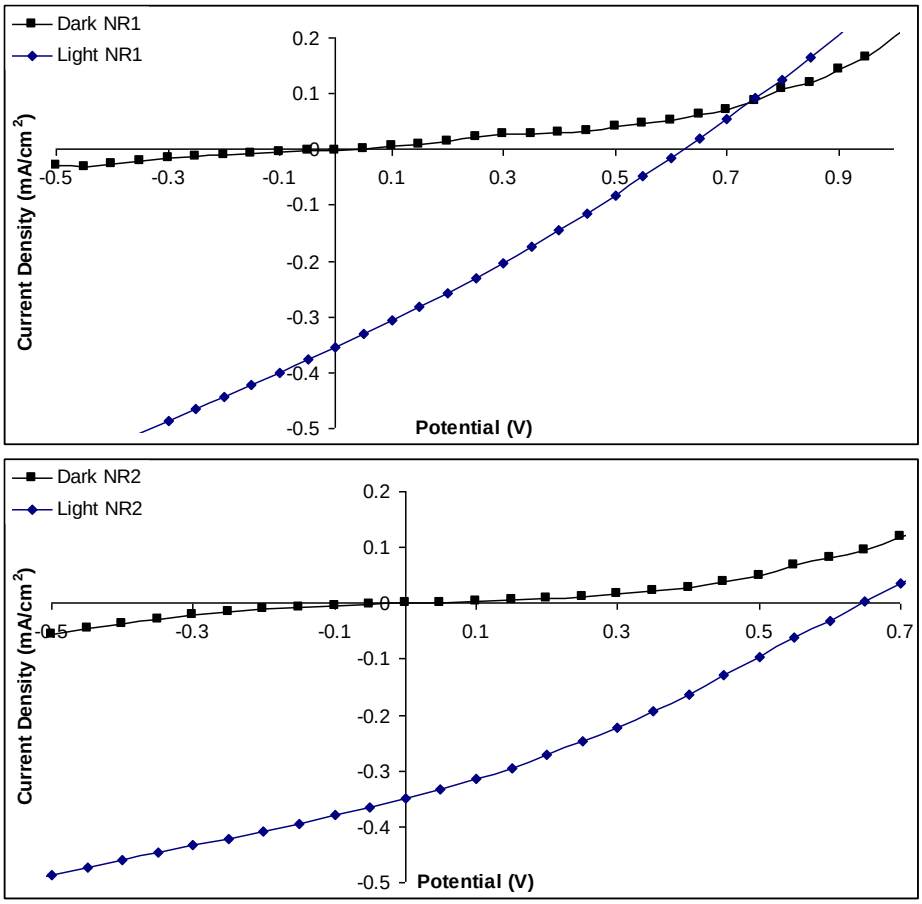


Figure S7. IV-characteristics of solar cells fabricated from P3KHT and NR1, NR2 including the response in the dark ("Dark") and under AM1.5 illumination ("Light").

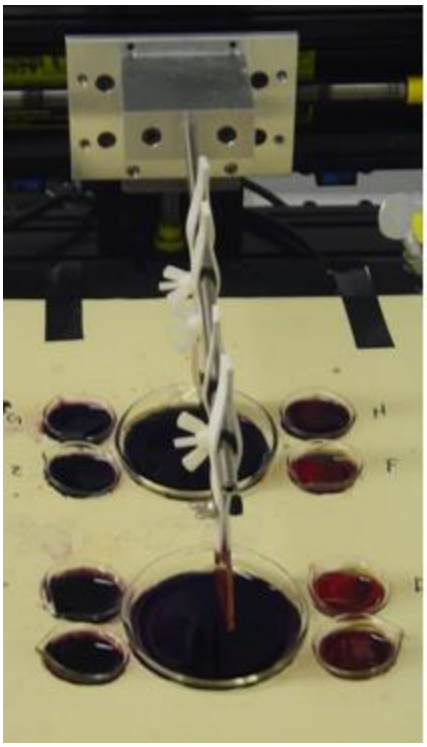


Figure S8. Experimental setup for ELBL film fabrication.

Table S3. Series and shunt resistances for a number of devices made in this study. Numbers represent the averages of 6 devices. Numbers in brackets indicate standard deviations.

Material	Series Resistance (Ohm/cm^2)	Shunt Resistance ($kOhm/cm^2$)
PTEBS / NR1	69.91 (13.63)	0.06 (0.02)
PTEBS / NR2	589.21 (383.85)	2.01 (0.58)
PTEBS / NR3	82.15 (50.38)	0.66 (0.36)
P3KHT / NR1	285.35 (203.15)	1.66 (0.50)
P3KHT / NR2	384.56 (163.33)	3.56 (1.78)