Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Engineering of modular organic photovoltaic devices with dye sensitized architecture

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Table S1:Photocurrent response of different PANI–PPA composites in both dark and illuminated condition.

Sample	2nd Cycle			5th Cycle		
	Dark Current (mA)	Photo Current (mA)	Relative Increase (%)	Dark Current (mA)	Photo Current (mA)	Relative Increase (%)
PP10	126.9	136.6	7.64	118.4	128.6	8.61
PP12	47.96	50.26	4.79	47.75	50.33	5.40
PP16	146.3	164.7	12.57	146.3	165.5	13.12
PP20	264.1	276.9	4.84	239.7	255.6	6.66

Table S2: Electrochemical parameters obtained from Nyquist plots of impedance spectra of PANI–PPA in acetic acid doped device.

R1 (Ω)	R_d (Ω)	CPE-P(1)	CPE-T (1)	R_{rec} (Ω)	C_μ (μF)	R_{CE} (Ω)	CPE-P (2)	CPE-T(2)	τ (ms)
12.7	13.2	0.719×10^{-6}	0.86	138.98	43×10^{-6}	43.23	1.8×10^{-7}	0.82	5.97

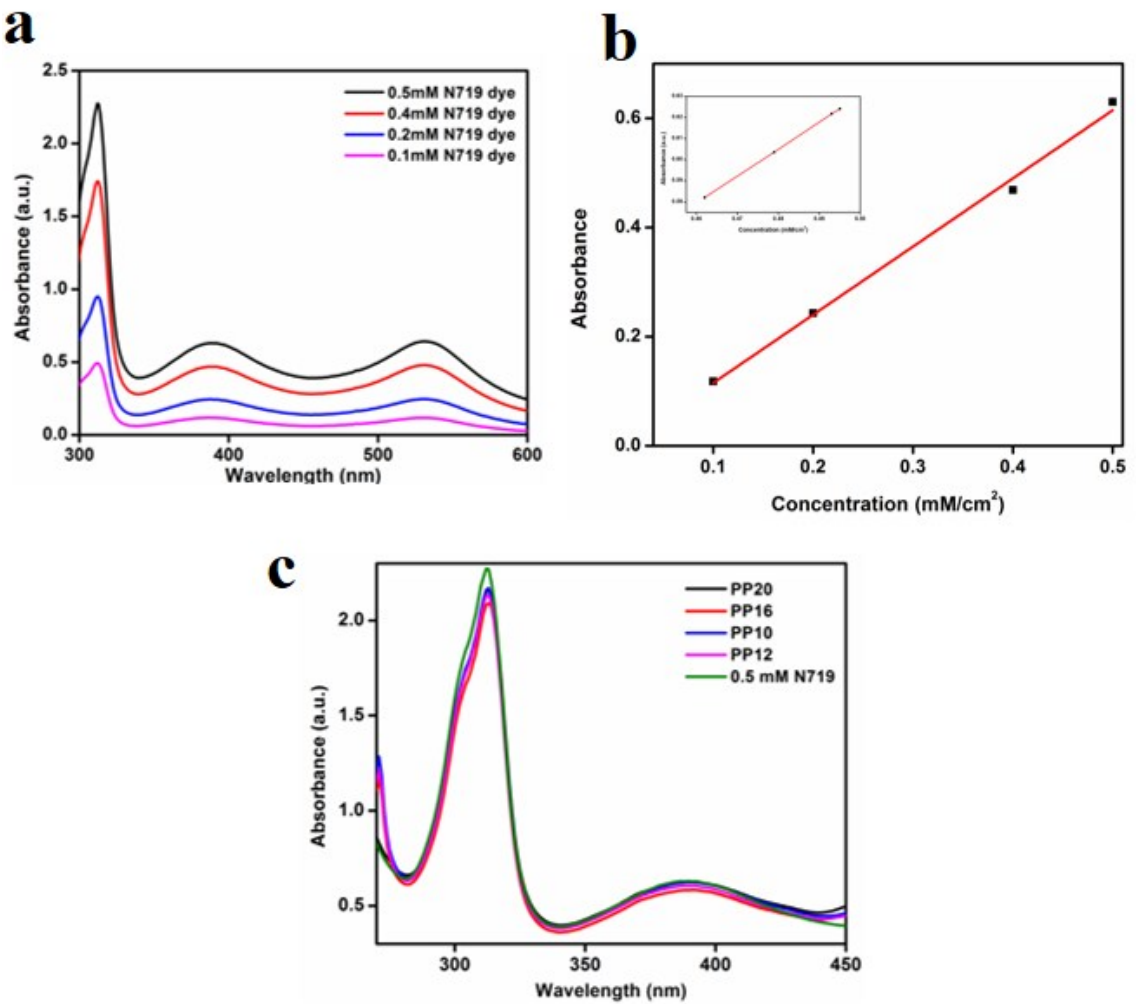

Fig S1:a. Absorbance spectra of standard N719 dye solutions at different concentration in ethanol, b. Calibration curve for N719 dye samples at 389 nm along with the best fit curve (Inset figure shows the unknown concentrations), c. Absorbance spectra of the residual N719 dye solutions for different PANI-PPA composite samples at different concentration in ethanol.

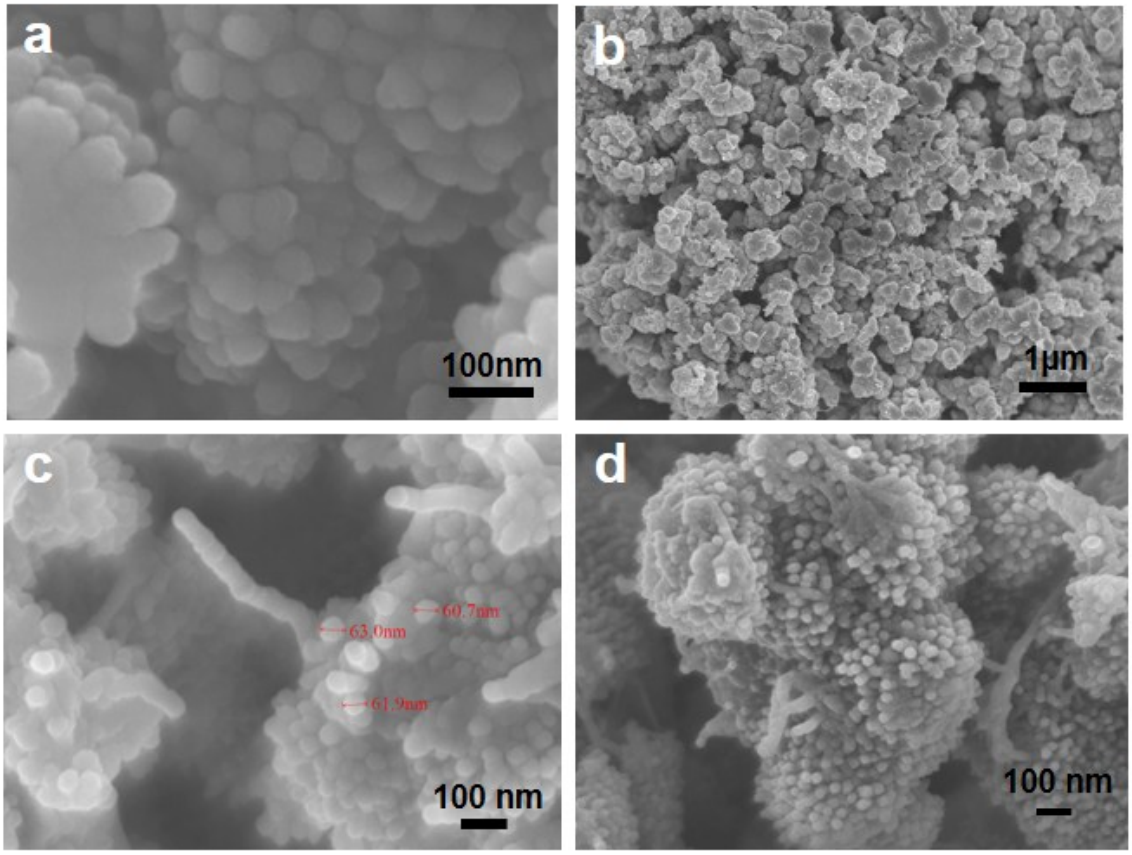

Fig.S2: a. SEM image of PP0 with higher resolution, b. SEM image of PP10, c-d. SEM images for PP16 composite with nanorod like morphology.

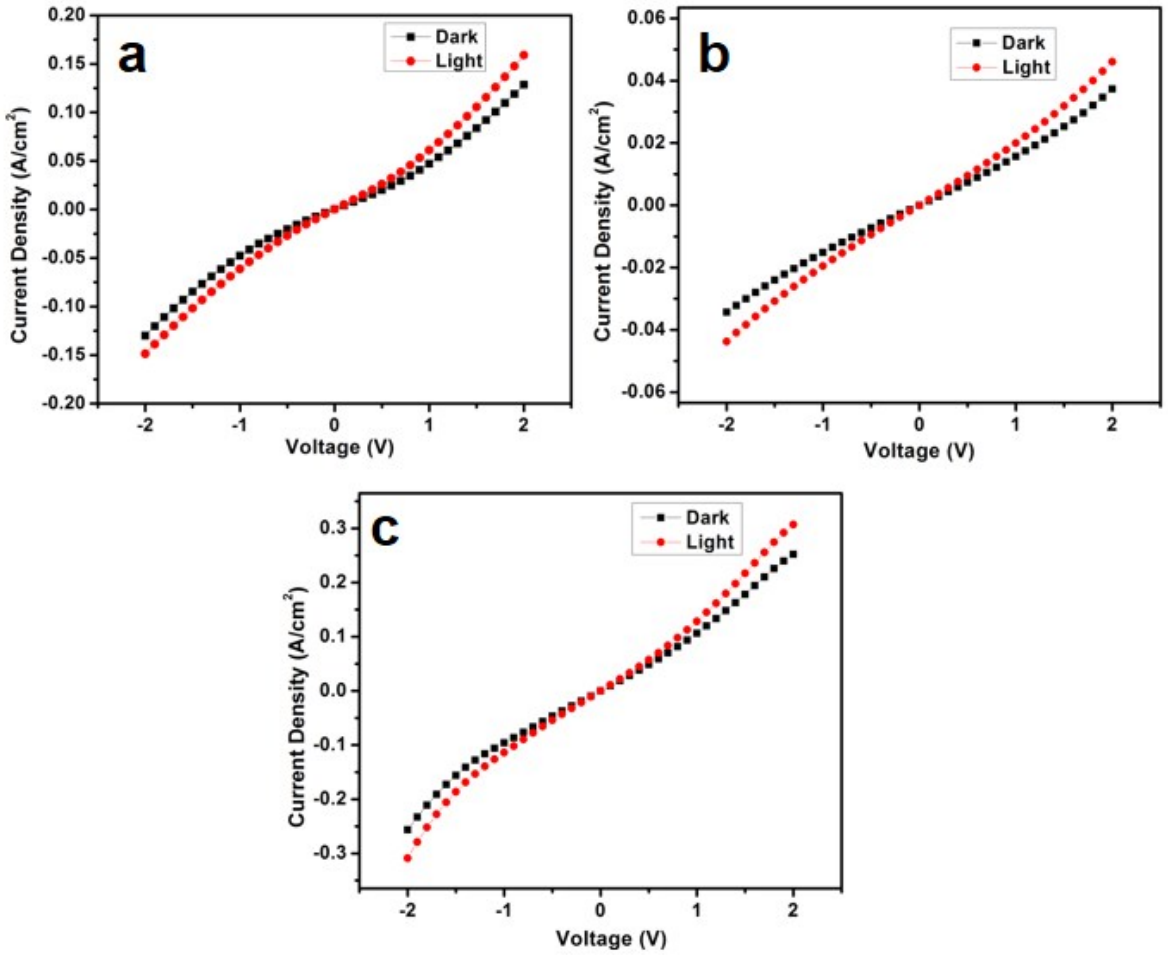

Fig. S3: Current-Voltage characteristics of a.PP10, b. PP12 and c. PP20 composites under dark and illumination condition.

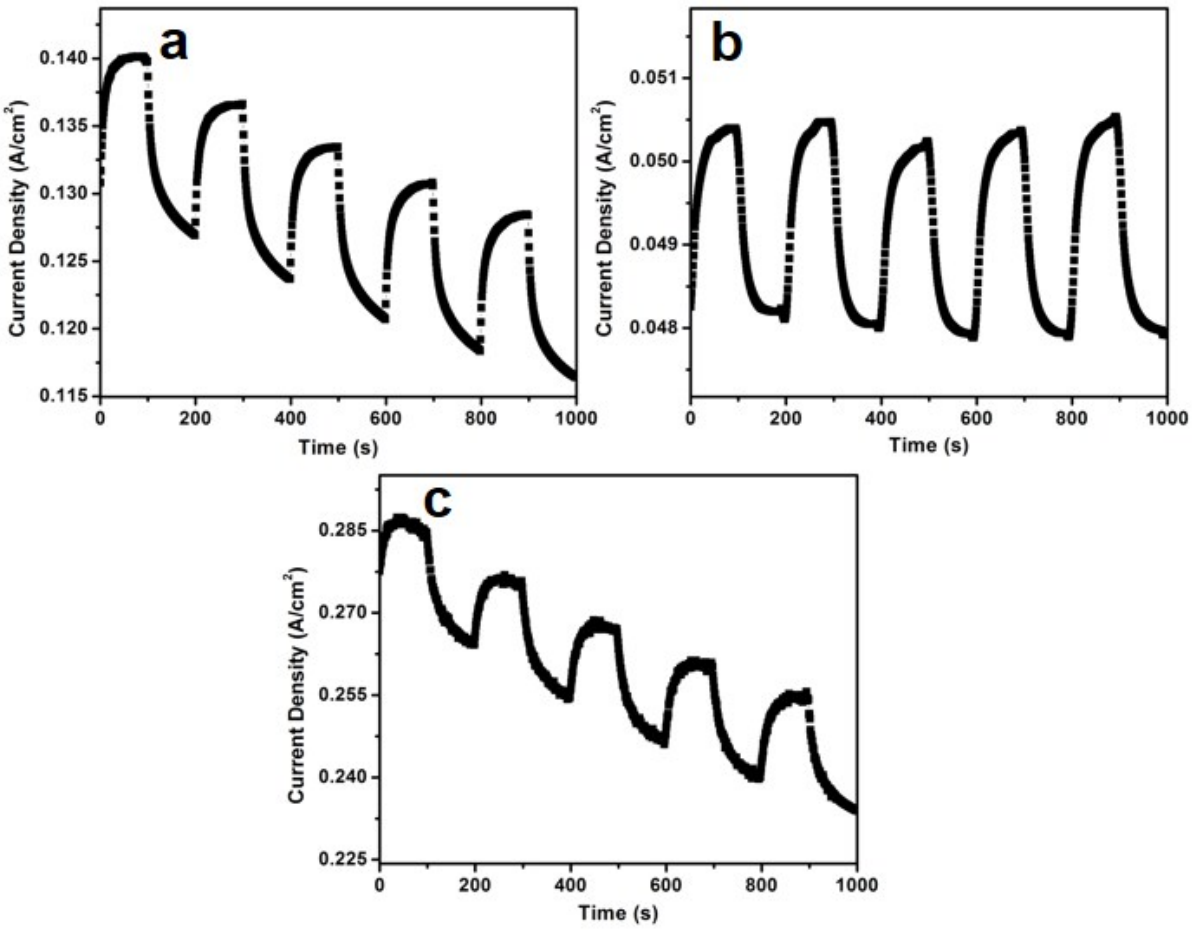

Fig. S4: On-off photocurrent response of a. PP10, b. PP12 and c. PP20 composites.

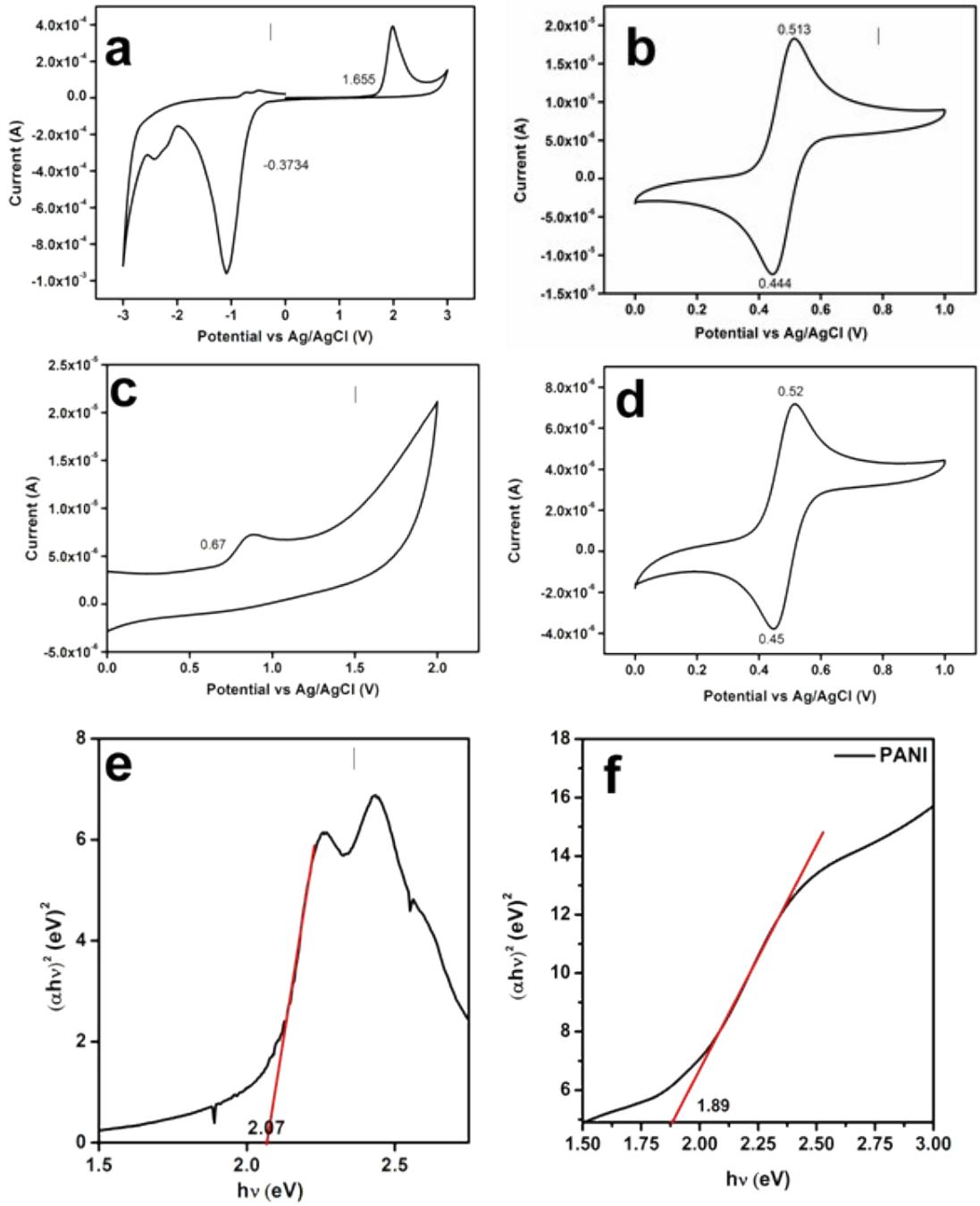

Fig. S5: Cyclic voltammogram plots of a. PPA; b. PPA-Ferrocene; c. Pure PANI and d. PANI-Ferrocene, Optical band gap of e. PPA and f. PANI from UV-visible spectra (red line indicates Tauc's plot)

$E_{HOMO} = [- 4.8 + E_{Fc/Fc+}^{1/2} - E_{ox}]$ eV

$E_{LUMO} = [- 4.8 + E_{Fc/Fc+}^{1/2} - E_{red}]$ eV

PANI: HOMO = - 4.99 eV

LUMO = - 3.10 eV

PPA: HOMO = -5.97 eV

LUMO = - 3.95 eV

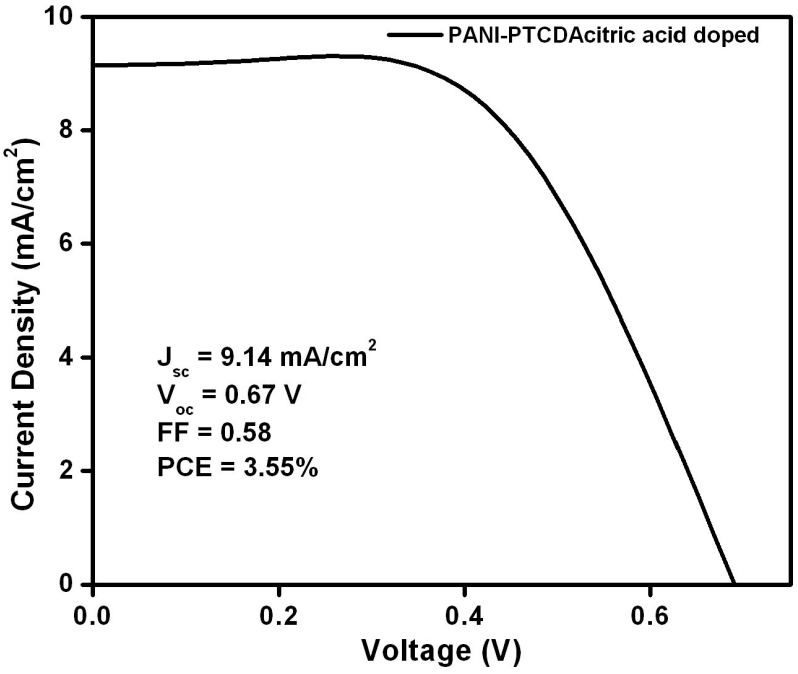

Fig. S6: J−V characteristics of PANI-PTCDA (produced in citric acid) device under simulated AM 1.5 solar irradiation of 100 mW/cm^2

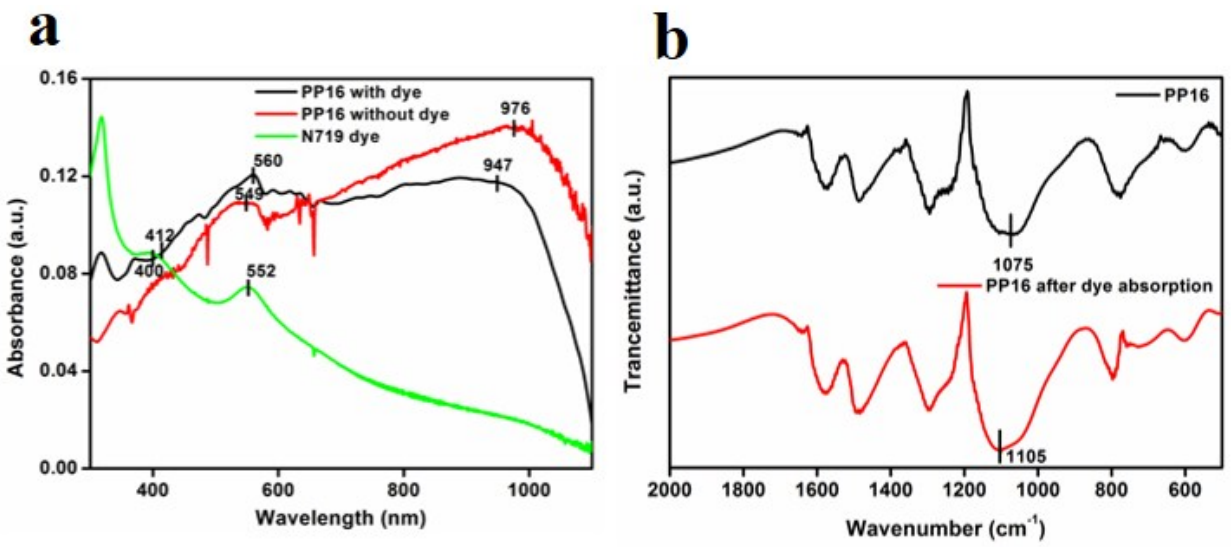

Fig. S7: a. Solid state UV-Vis spectra of N719 dye, PP16 composite and the PP16 composite after dye absorption, b. FTIR spectra of PP16 composite before and after dye absorption.

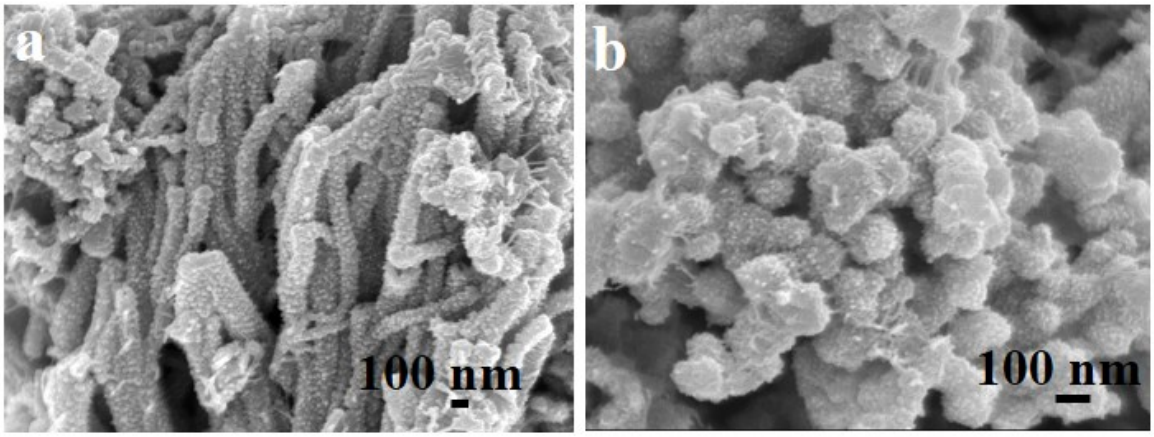

Fig. S8: SEM images of a. PANI-PPA acetic acid doped, b. PANI-PTCDA citric acid doped.

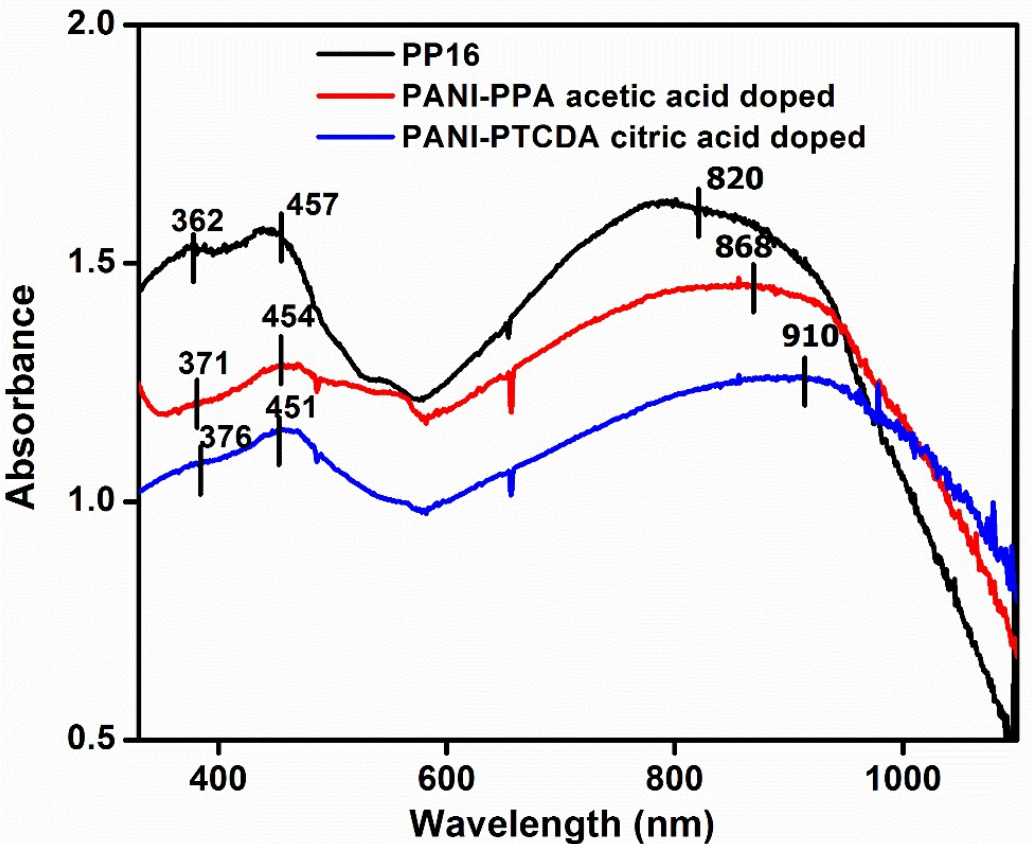

Fig. S9: UV-vis spectra of PP16, PANI-PPA composite with acetic acid doped and PANI-PTCDA composite with citric acid doped.

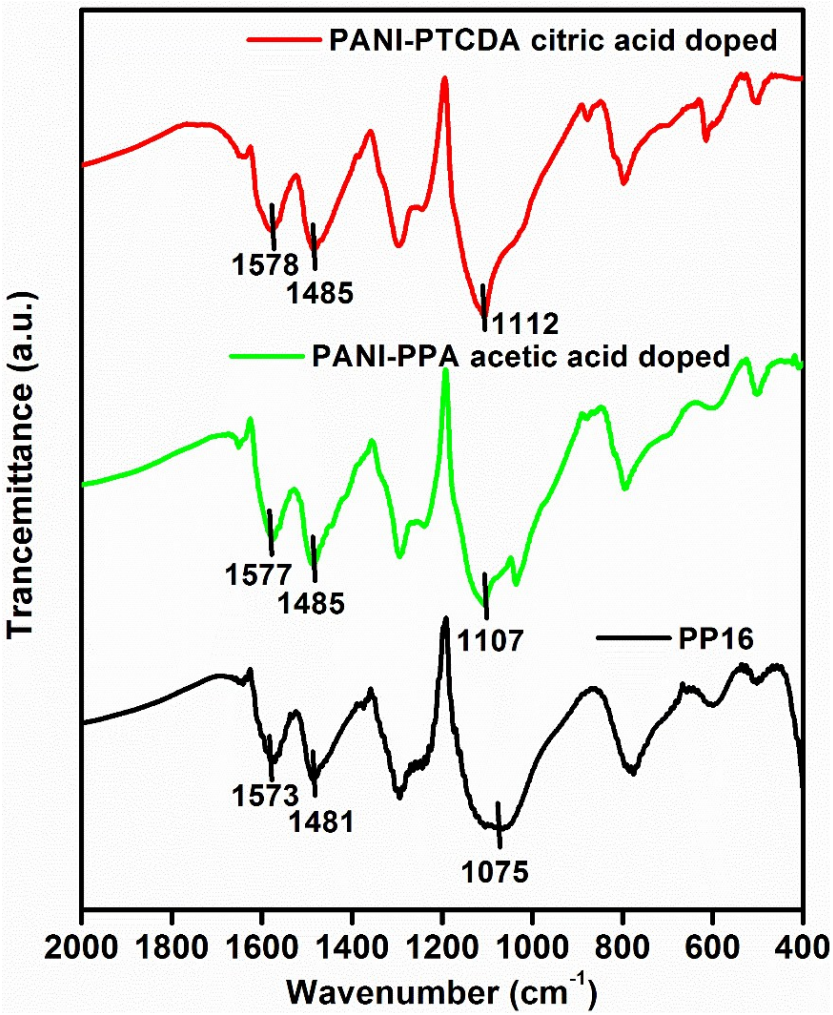

Fig. S10: FTIR spectra of PP16, PANI-PPA composite with acetic acid doped and PANI-PTCDA composite with citric acid doped.

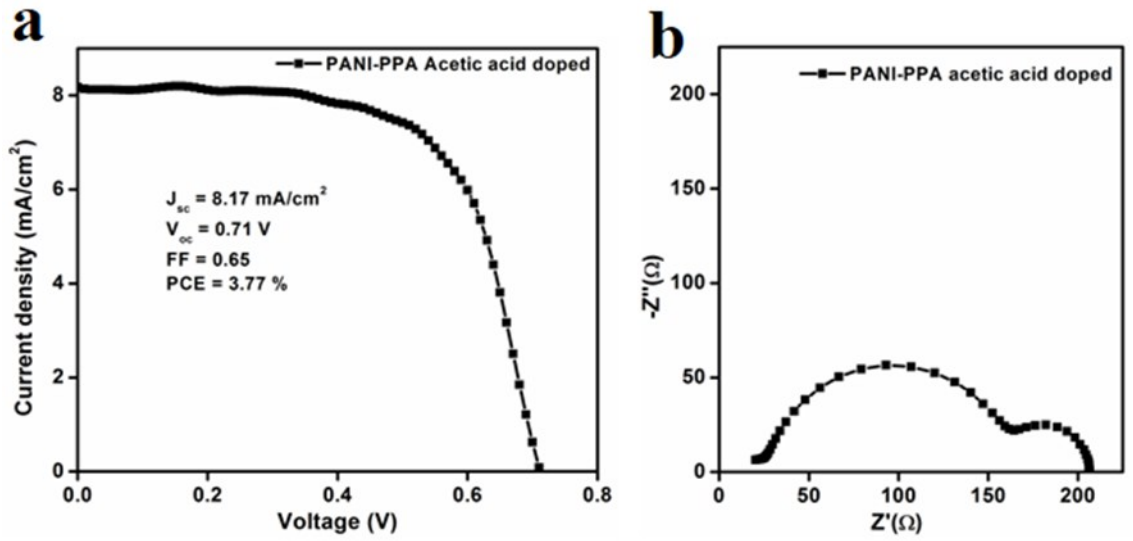

Fig. S11: a.J−V characteristics plots of PANI-PPA in acetic acid doped device under simulated AM 1.5 solar irradiation of 100 mW/cm^2, b. Nyquist plots from electrochemical impedance spectroscopy for PANI–PPA in acetic acid doped device.