

Supporting Information

Robust hybrid hydrogels with good rectification property and its application as an active material for dye sensitized solar cell: Insights from AC impedance spectroscopy

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Table S1. Cell parameters of DSSCs made by P & PEDOT:PSS (PP) and GO and PEDOT: PSS (GPEDOT).

Samples	J_{SC} (mA cm⁻²)	V_{OC} (V)	FF	PCE %
PP	0.96	0.79	0.36	0.27
GPEDOT	8.20	0.63	0.63	3.25

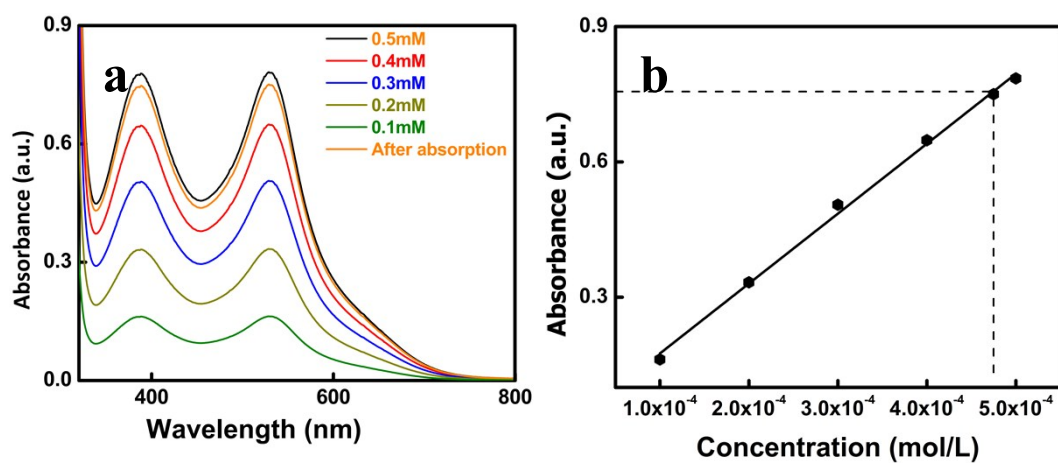
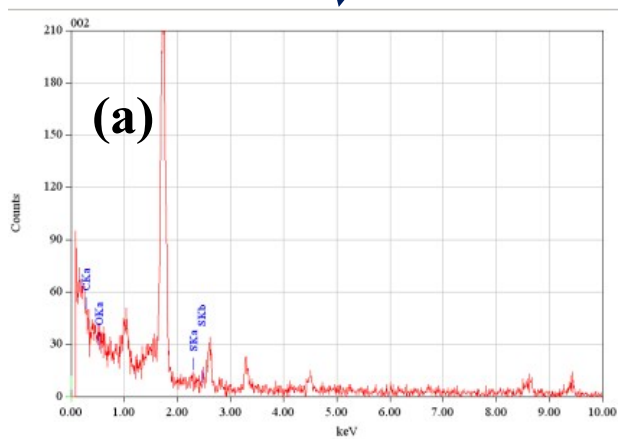
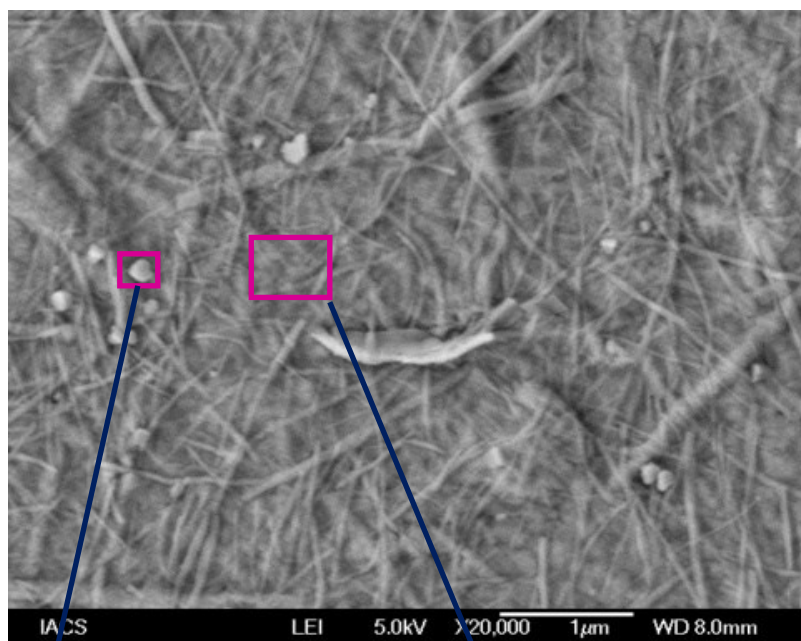
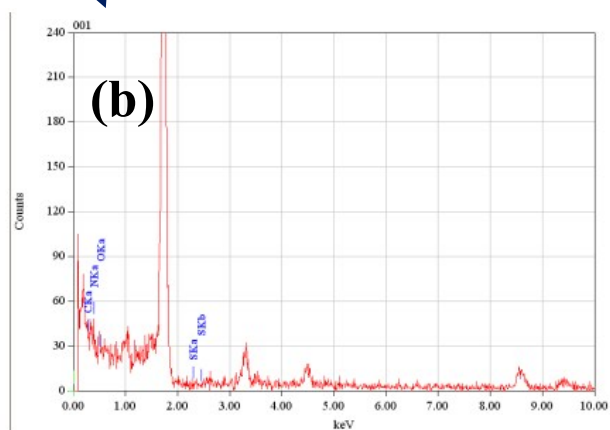


Fig. S1 (a) Absorbance spectra for N719 dye samples at different concentration in ethanol (b) Calibration curve for N719 dye samples at 530 nm along with the best fit curve.



Ele...	Cl...	(keV)	mass%	Error%	At%
C	K*	0.277	92.85	16.35	97.20
O	K*				
S	K*	2.307	7.15	7.69	2.80
Total			100.00		100.00



Ele...	Cl...	(keV)	mass%	Error%	At%
C	K	0.392	31.69	15.79	34.71
N	K*	0.525	67.84	45.83	65.06
O	K				
S	K	2.307	0.47	8.30	0.22
Total			100.00		100.00

Fig. S2 (a), (b) are EDS spectra of the selected area from the FESEM micrograph of GPPS1 gel.

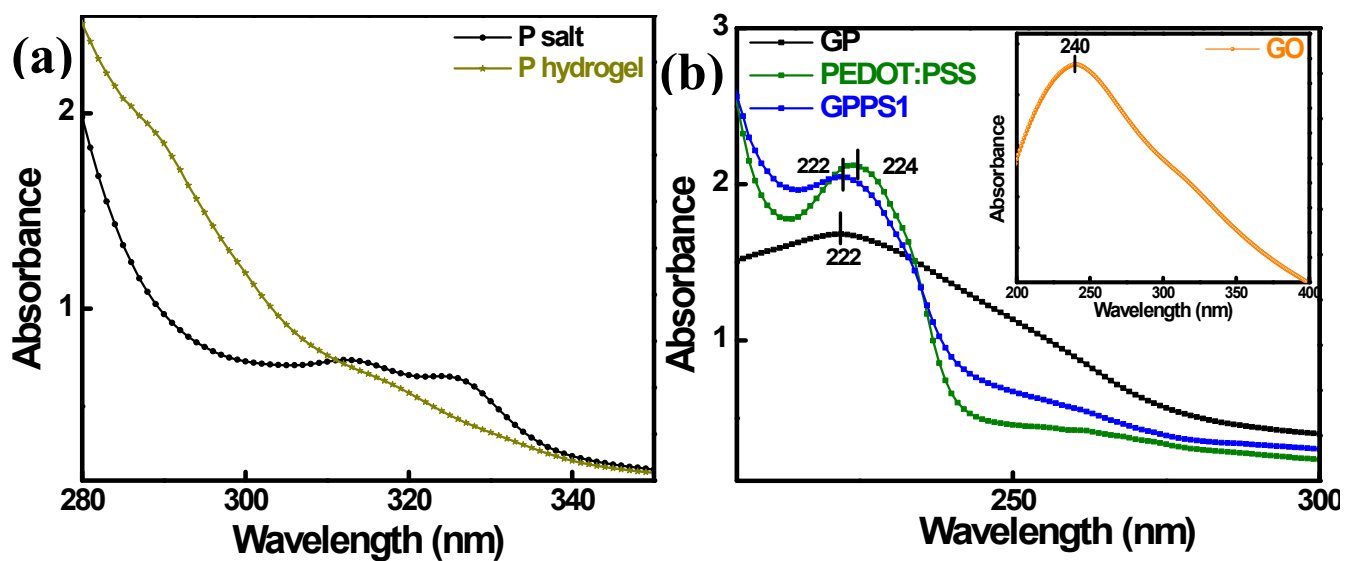


Fig. S3 UV-vis spectra of (a) P solution (0.05% (w/v)) and after addition dilute acid to it forming P assembly (b) Aqueous dispersions of the GP gel, PEDOT:PSS solution and GPPS1 gel (inset: UV-vis spectra of GO)

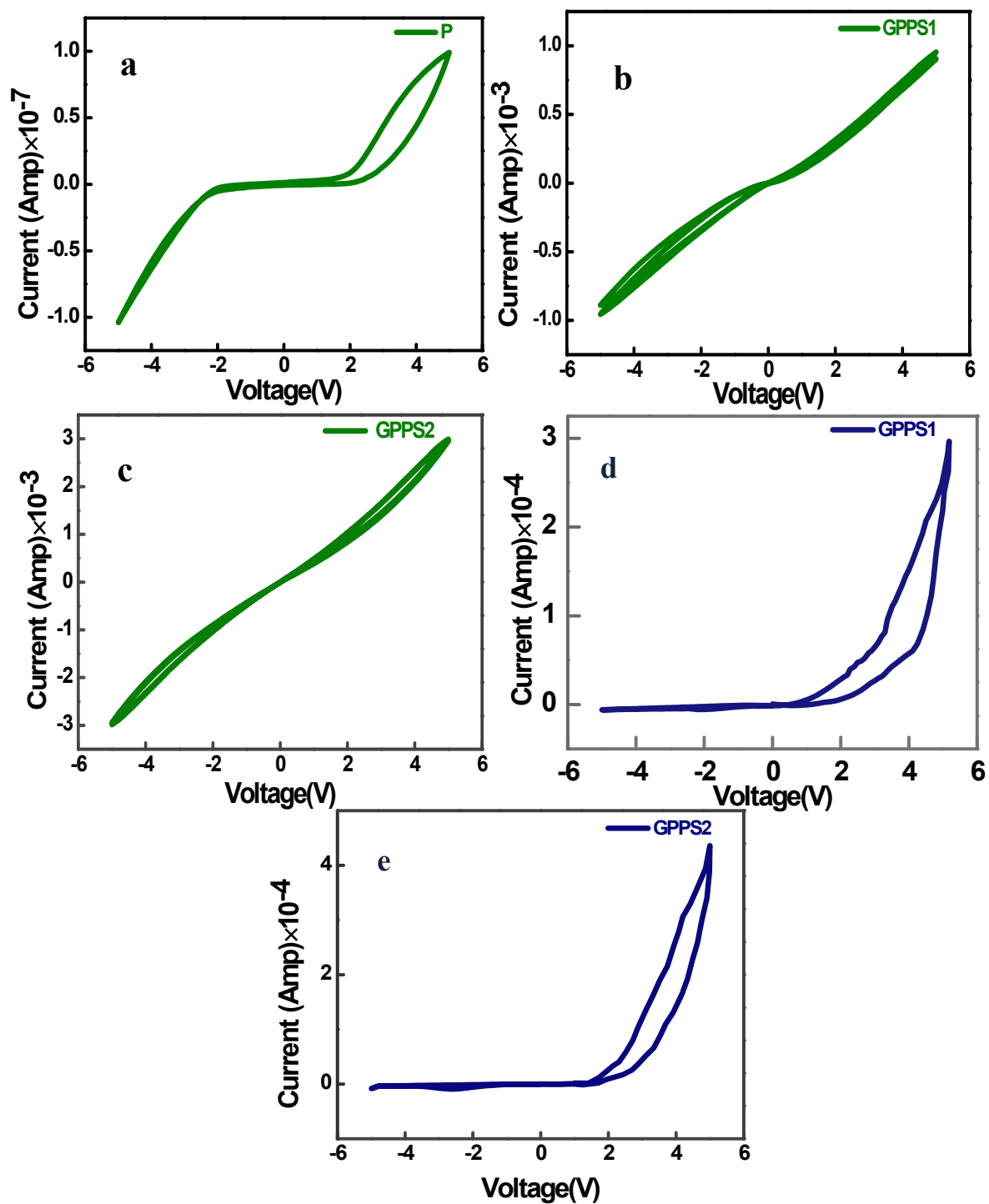


Fig. S4 I - V characteristic curves of the (a) **P**, (b) GPPS1, (c) GPPS2 xerogels; (d) GPPS1 and (e) GPPS2 gels.

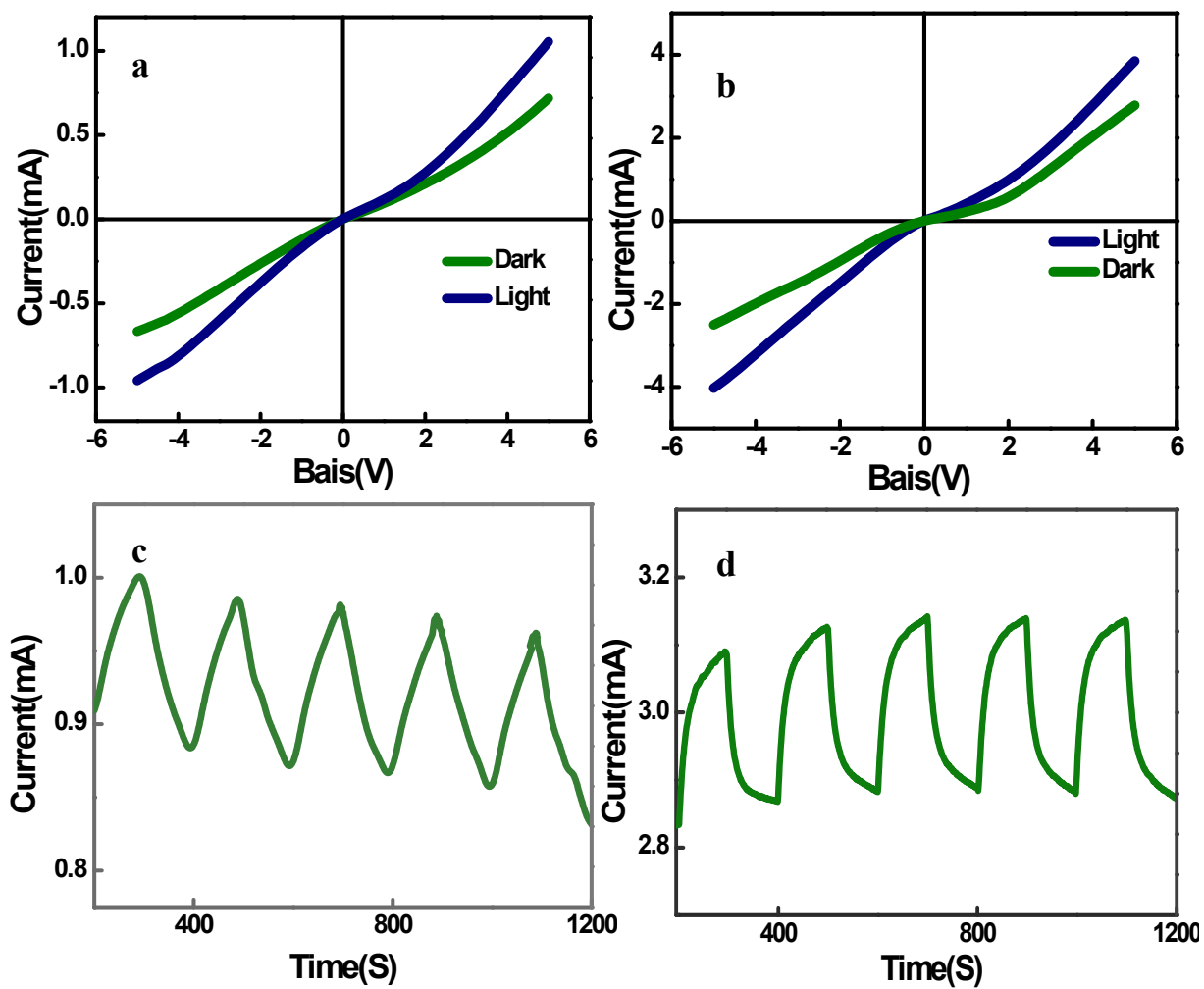


Fig. S5 $I-V$ curve of the (a) GPPS1, (b) GPPS2 xerogel under dark and illuminating conditions. Photocurrent cycles showing the on and off cycles by switching the white light illumination on and off for the (c) GPPS1, (d) GPPS2 xerogel.

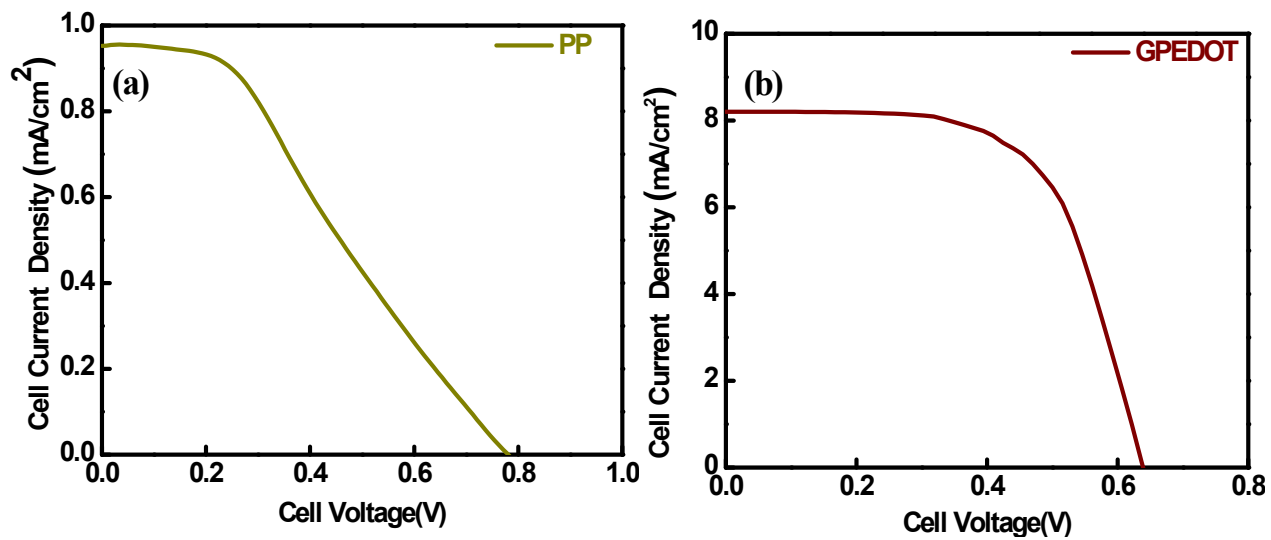


Fig. S6 Plot of J-V characteristics of PP and GPEDOT under AM 1.5G light illumination of 100 mW/cm²

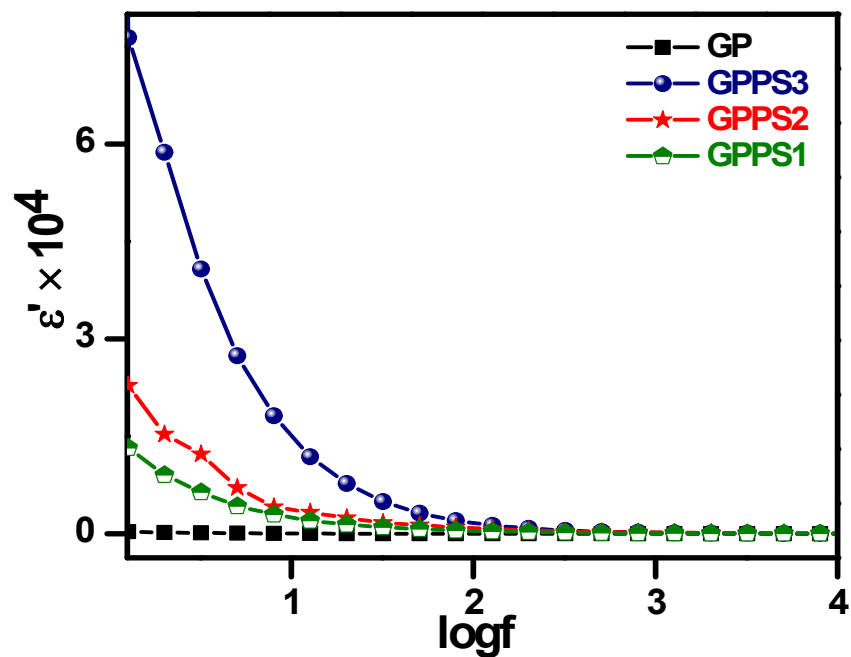


Fig. S7 Plot of permittivity of the sample with log f of GPPS1, GPPS2 and GPPS3 xerogels. As typical of any polar medium, the dielectric permittivity significantly increases with increase in conducting polymer.