Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Cleavable and removable polymer for organic field effect transistor packaging

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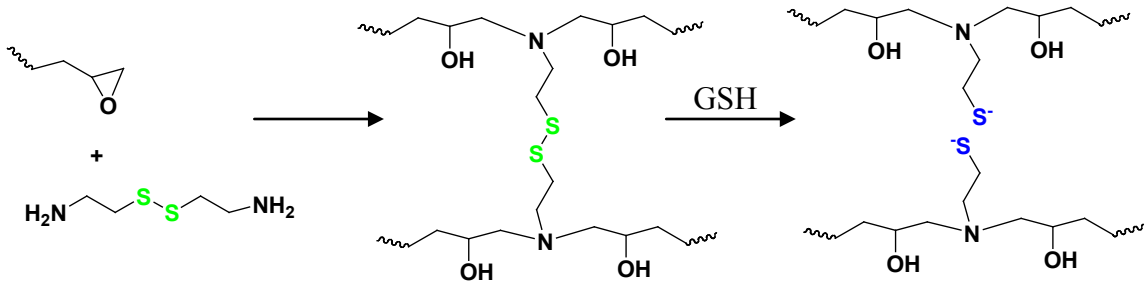

Scheme S1. Preparation of polymer thermosets

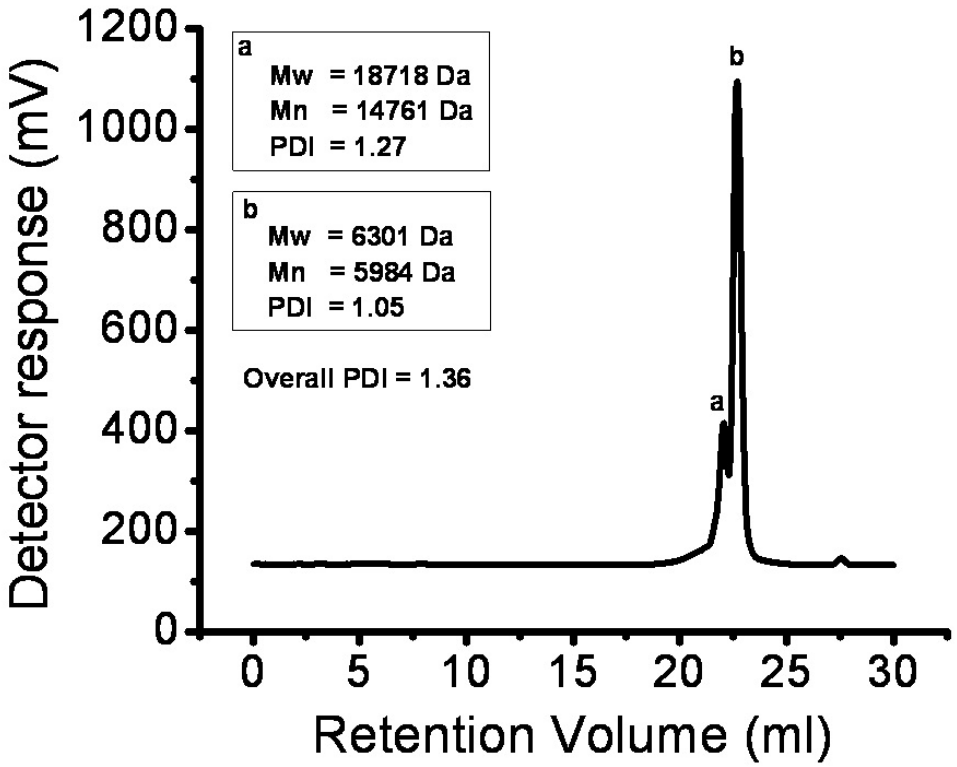

Fig. S1 Gel permeation chromatogram of epoxy resin

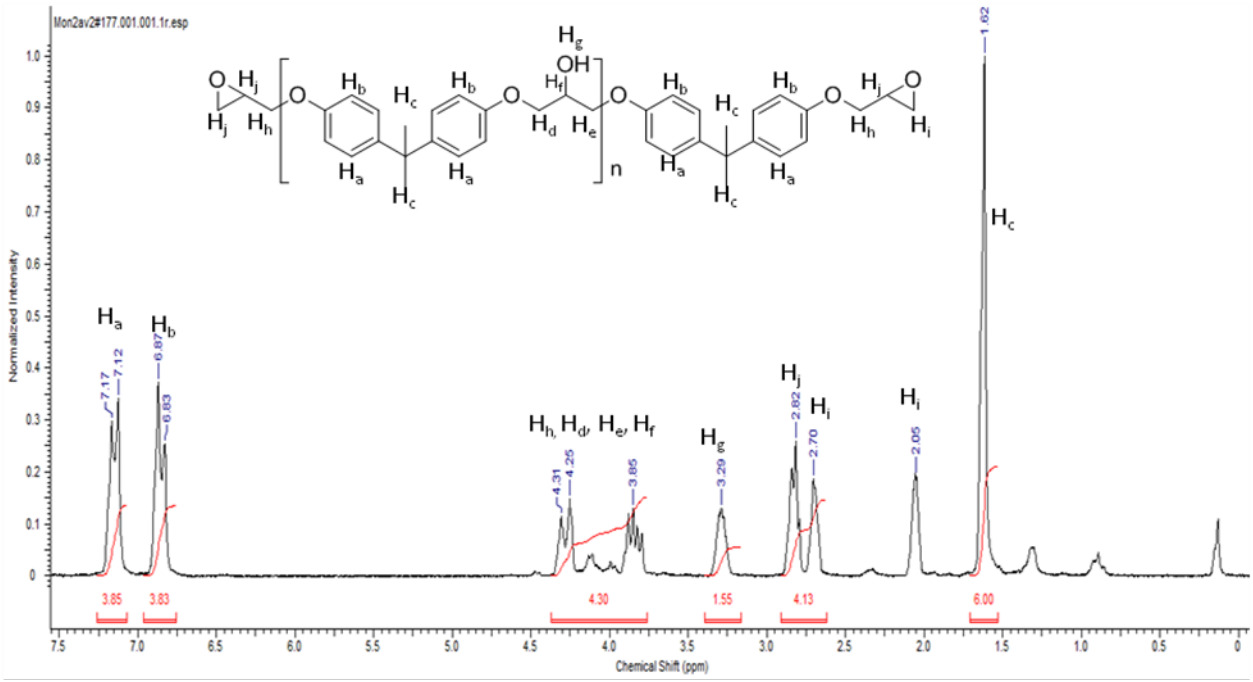

Fig. S2 ^{1}H-NMR spectrum of epoxy resin (200 MHz, Acetone-d_6)

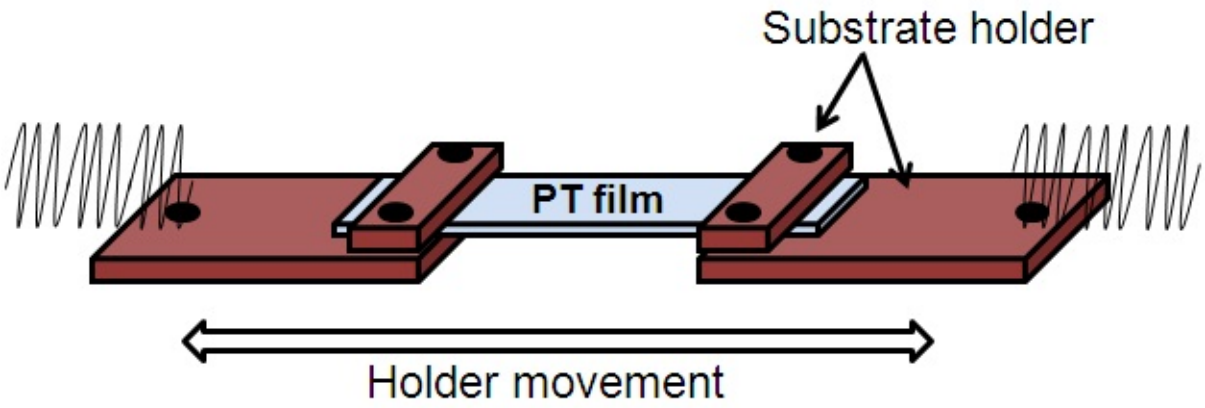

Fig. S3. Cartoon showing the experimental setup for mechanical analysis of PTs.

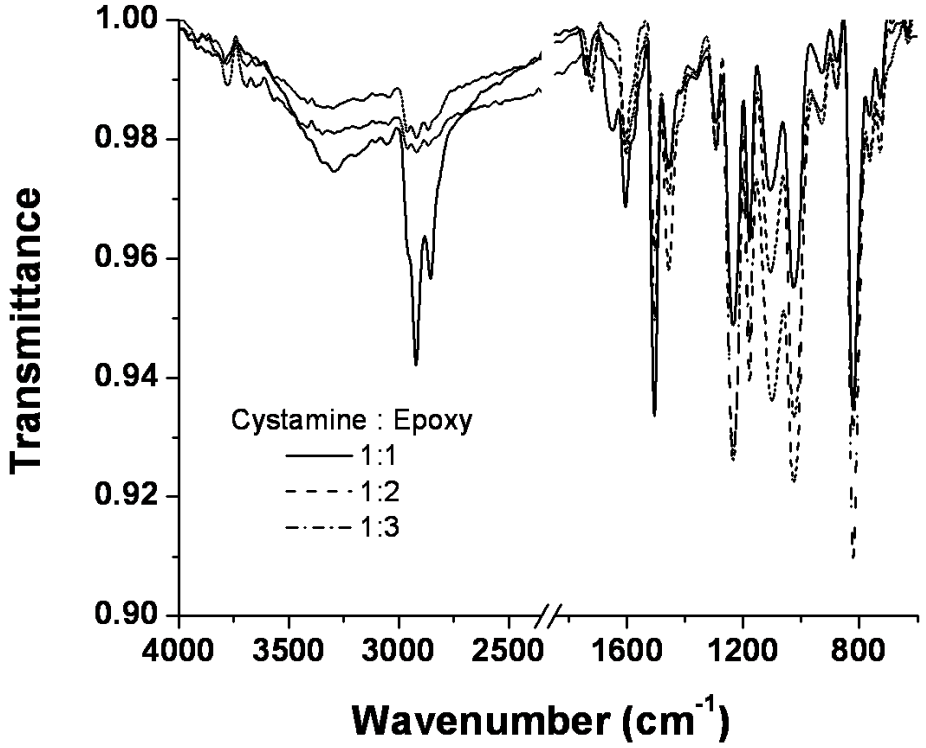

Fig. S4. ATR IR spectra of thermosets PT1, PT3 and PT5.

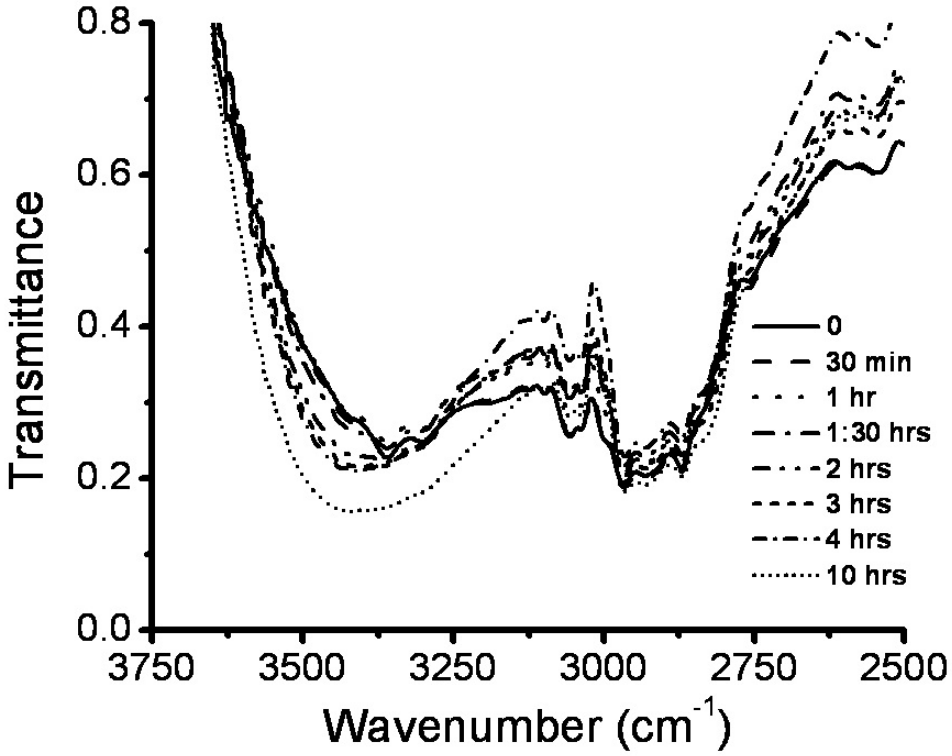

Fig. S5 ATR IR spectra of PT1 as a function of time

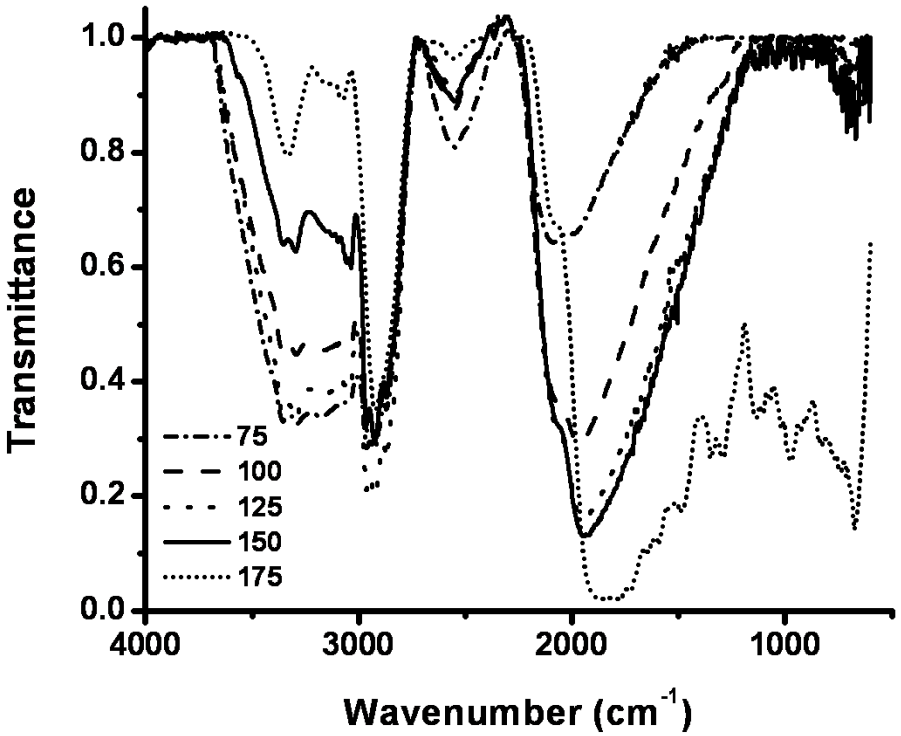

Fig. S6. ATR IR spectra of thermosets PT1 as a function of temperature.

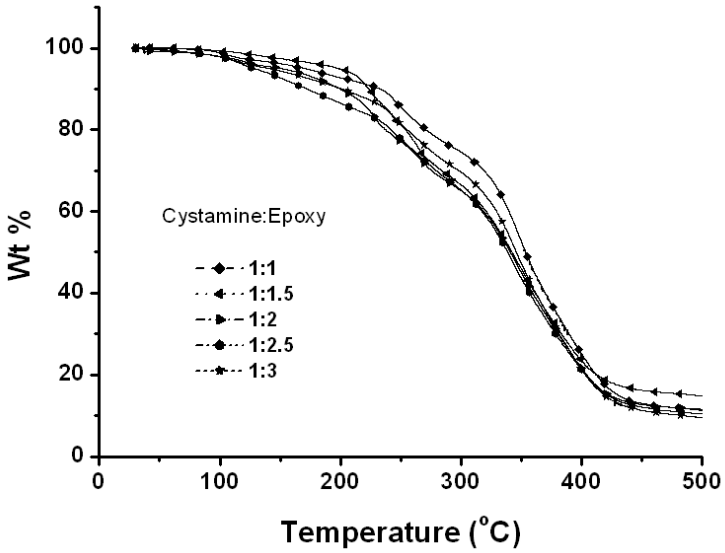

Fig. S7. Thermo gravimetric analysis showing the percentage weight loss as a function of temperature for various polymer thermoset mixtures (PT1 to PT5).

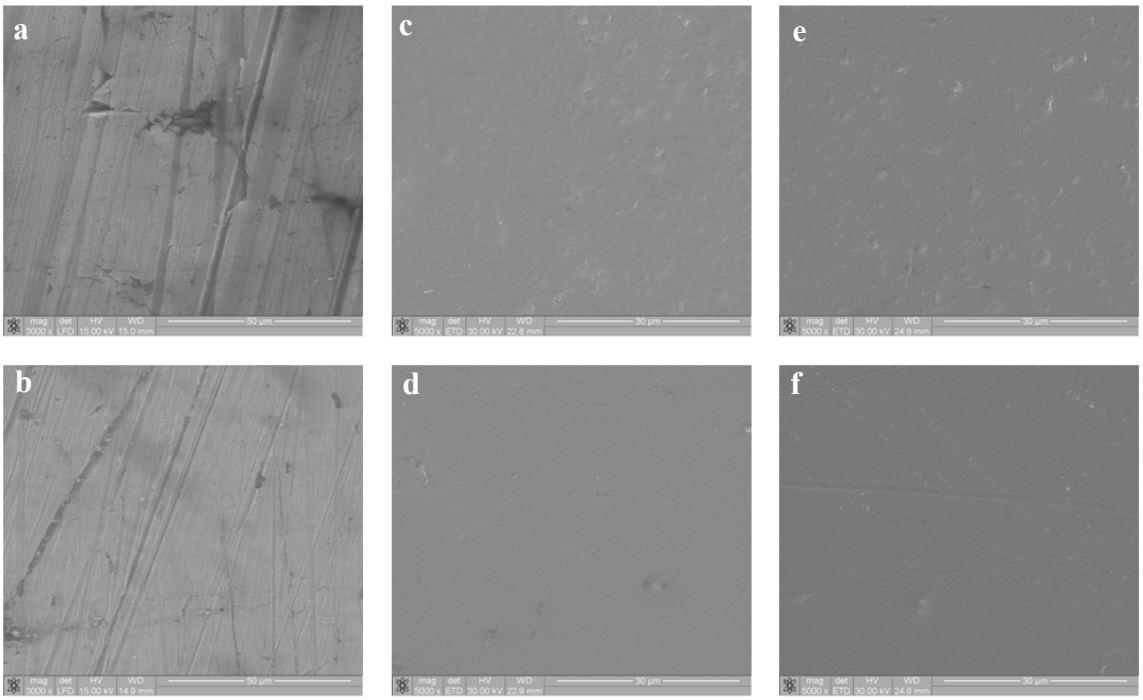

Fig. S8. Scanning electron microscopic (SEM) image showing before and after removal of PT1 layers from Cu (a and b), glass (c and d) and plastic (e and f) substrates without destroying the surface. After removal of PTs, the surfaces are cleaner due to washing effect.

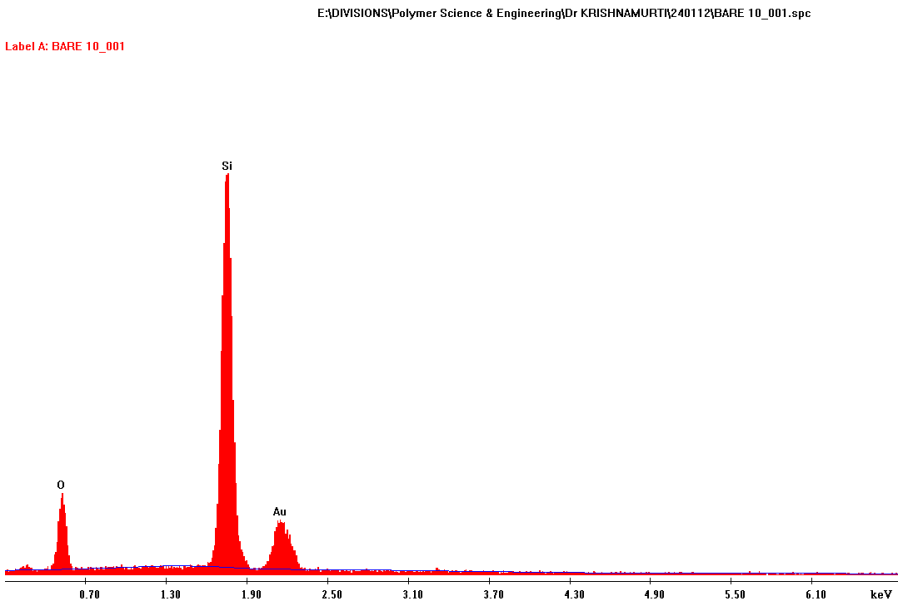

Fig. S9. Energy dispersive X-ray spectroscopic analysis (EDX) showing the elemental composition of normal device surface.

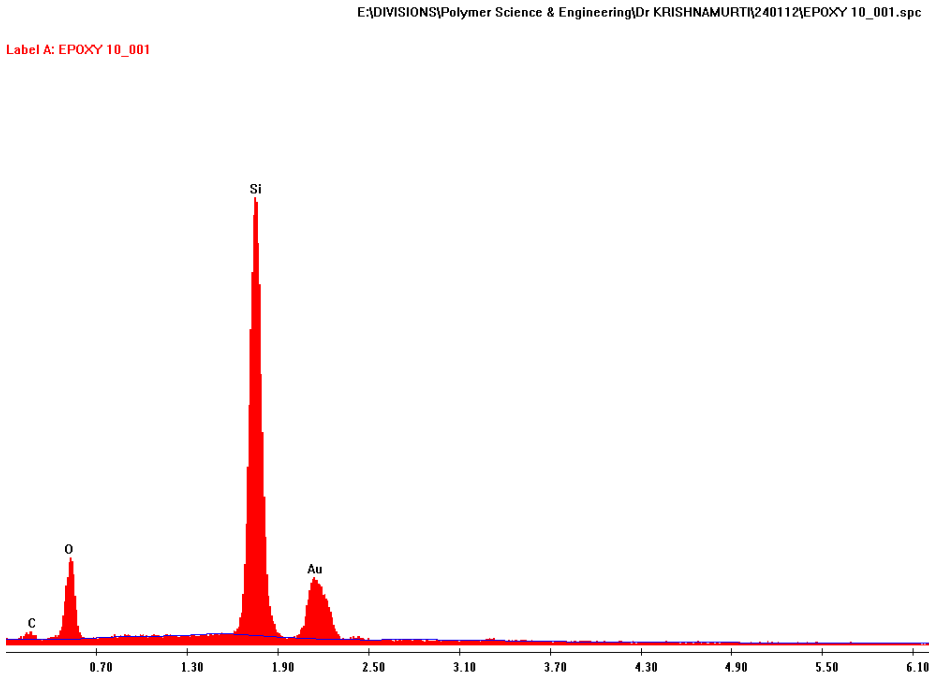

Fig. S10. Energy dispersive X-ray spectroscopic analysis (EDX) showing the elemental composition of polymer thermoset cleaved FET substrate.

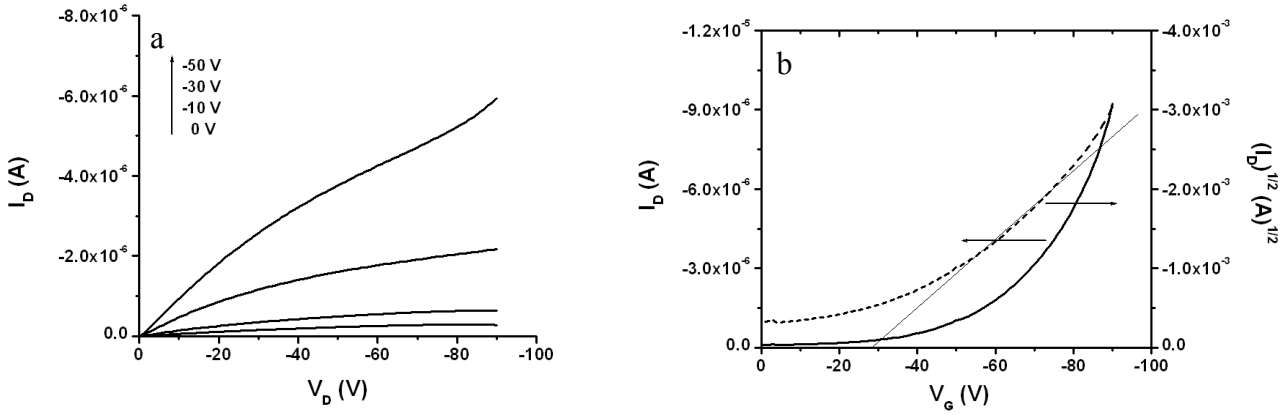

Fig. S11. Output (a) and Transfer (b) characteristic I-V curve for P3HT thin films with PMMA layer (After cleaving the thermoset layers).

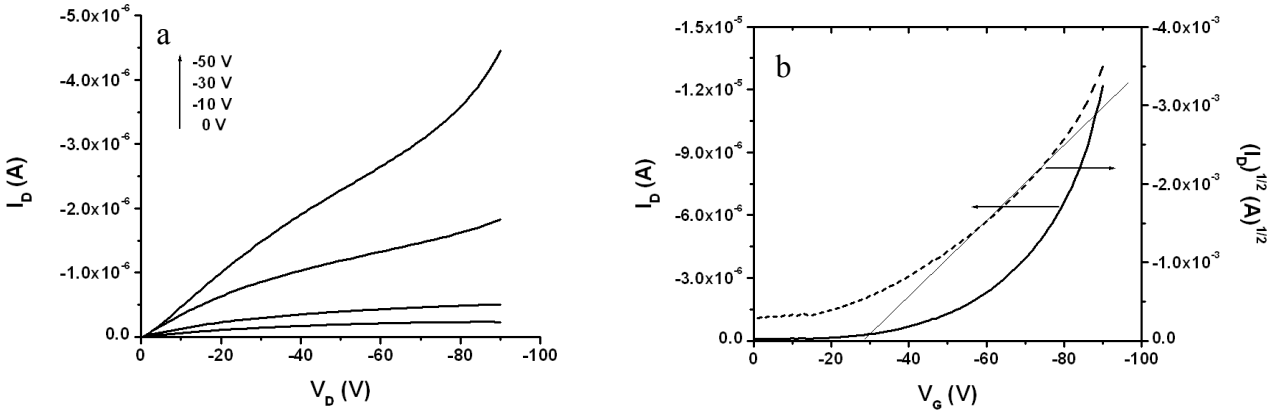

Fig. S12. Output (a) and Transfer (b) characteristic I-V curve for P3HT thin films (After removing the PMMA and thermoset layers).

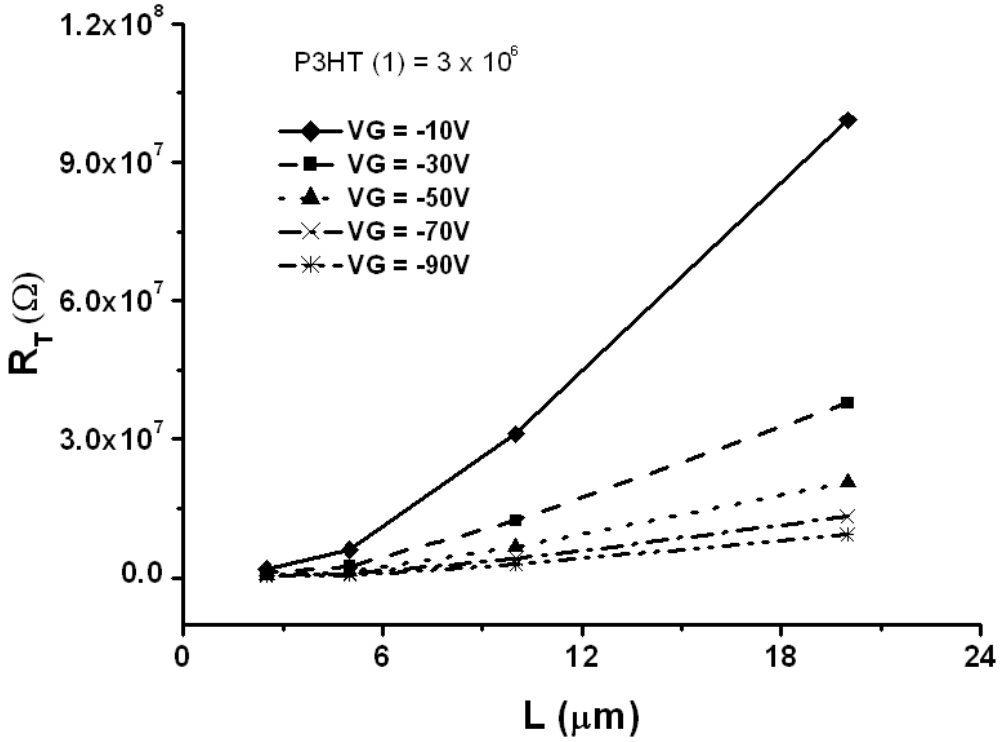

Fig. S13. Total resistance (R_T) as a function of channel length (L) for P3HT films.

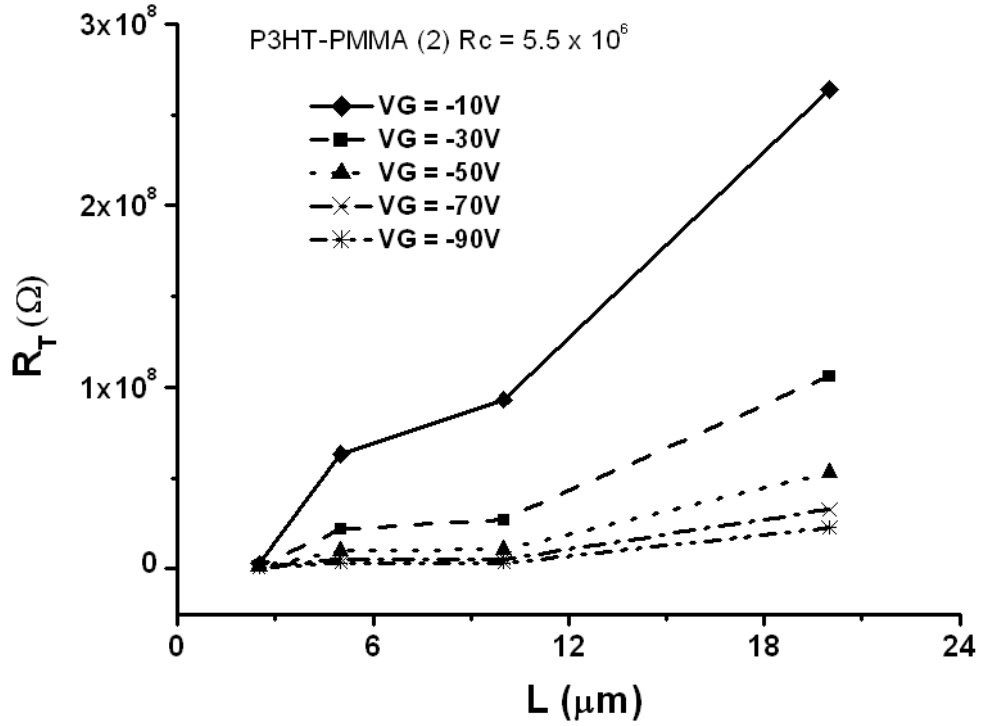

Fig. S14. Total resistance (R_T) as a function of channel length (L) for P3HT films with PMMA coating.

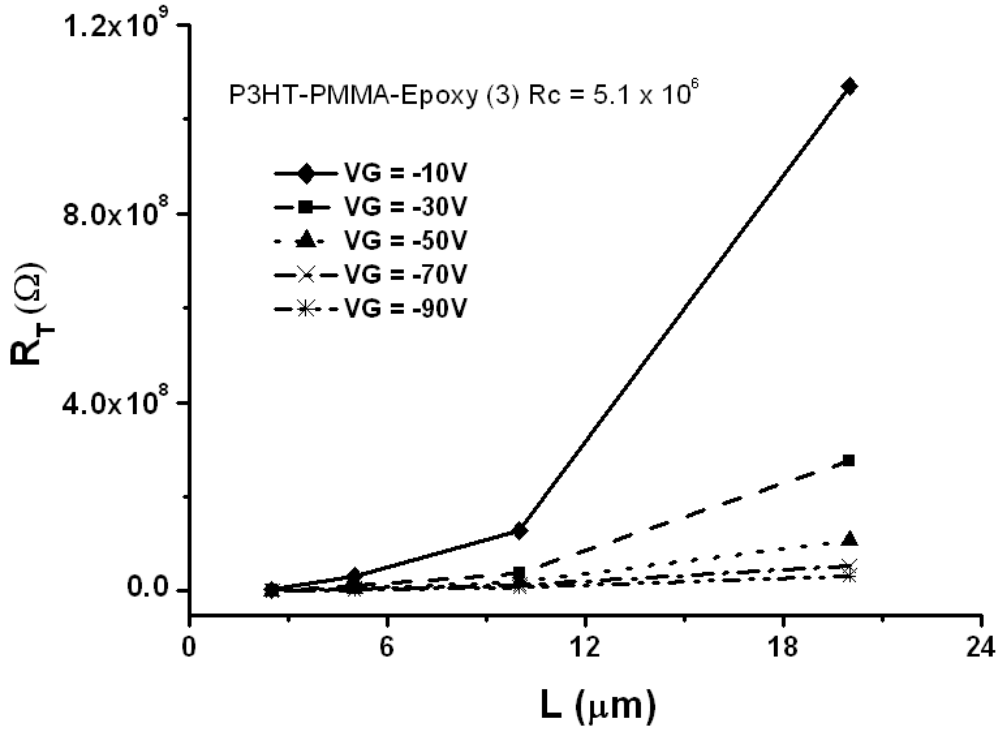

Fig. S15. Total resistance (R_T) as a function of channel length (L) for P3HT films with PMMA and thermoset layers.

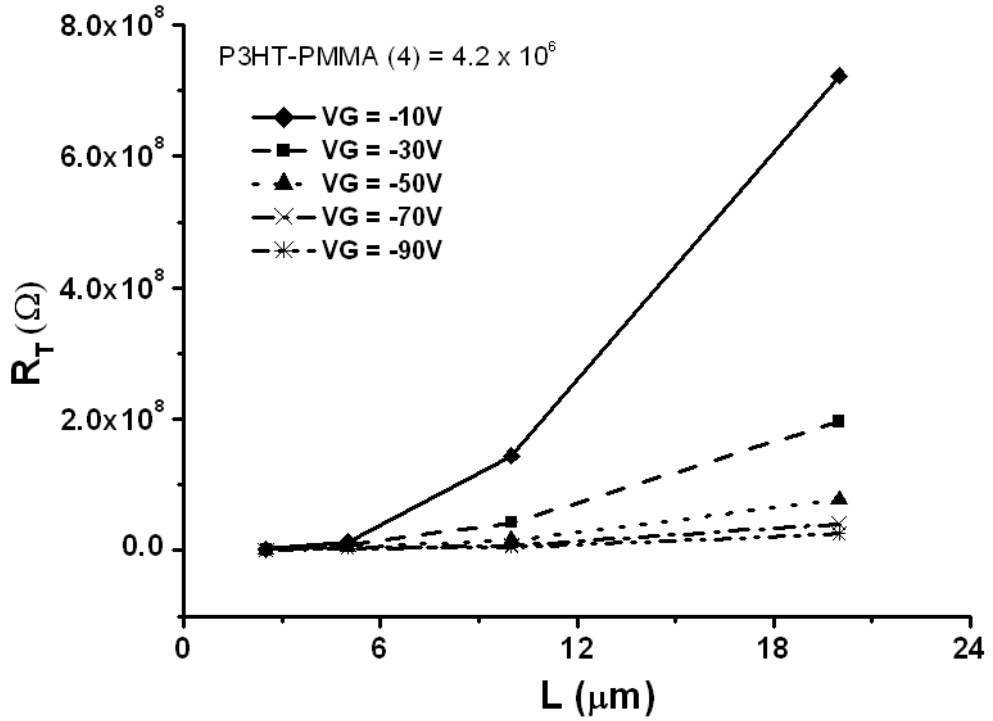

Fig. S16. Total resistance (R_T) as a function of channel length (L) for P3HT films with PMMA (After cleaving the thermoset layers).

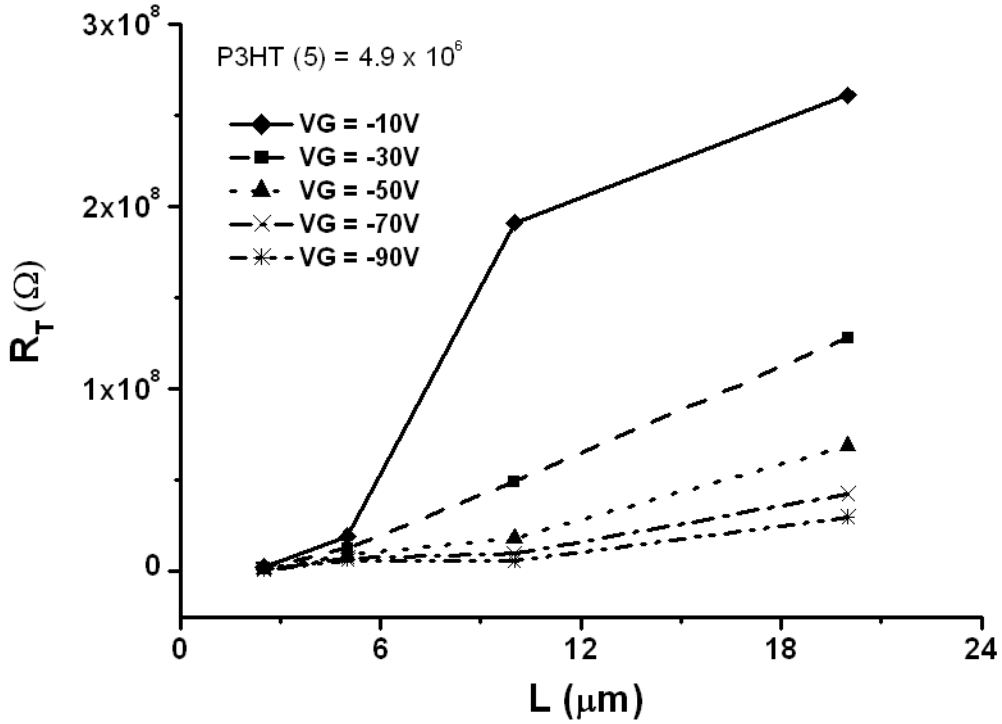

Fig. S17. Total resistance (R_T) as a function of channel length (L) for P3HT films (After removing the PMMA and thermoset layers).

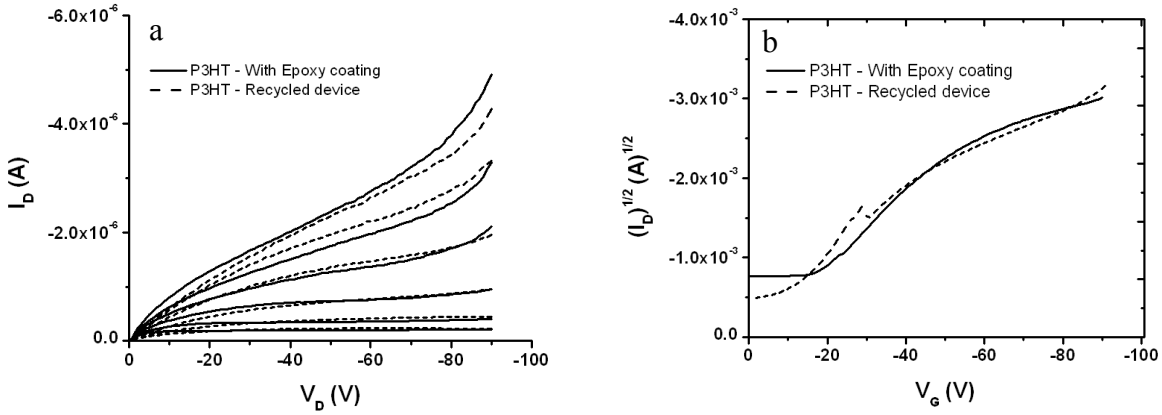

Fig. S18. Output (a) and Transfer (b) Characteristic I-V curves for P3HT devices coated with PT and PT cleaved recycled devices.

Table S1. Mechanical and thermal properties of polymer thermosets

S. No	Thermoset	Ratio Cys : Epoxy	λ	% Weight loss at temperatures				
				0%	25%	50%	75%	100%
1	PT1	1:1	4.6×10^5	233	298	353	400	446
2	PT2	1:1.5	2.0×10^6	202	266	342	396	439
3	PT3	1:2	6.0×10^6	209	259	341	392	433
4	PT4	1:2.5	6.0×10^6	218	260	339	390	439
5	PT5	1:3	6.0×10^6	220	274	346	392	440