

Electronic Supplementary Information

Polymer-graphite composite: A versatile use & throw plastic chip electrode

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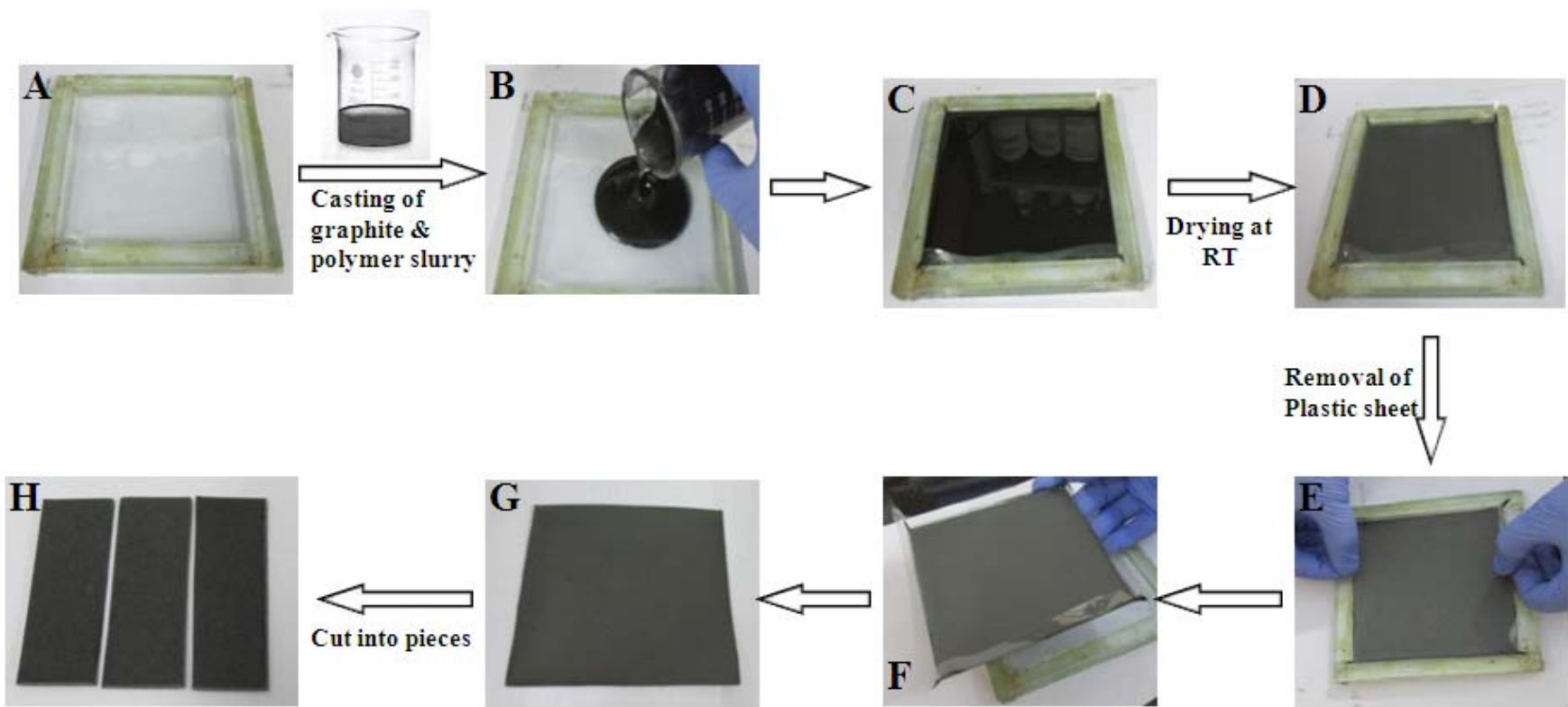
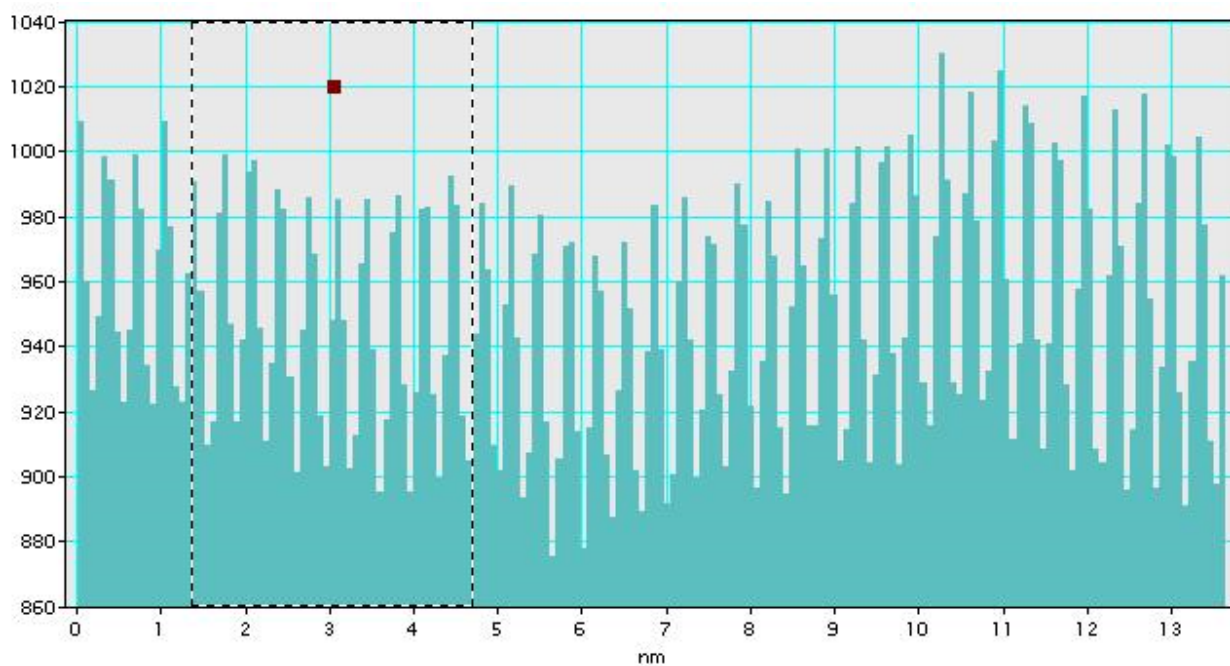


Figure S-1: Pictorial representation for making the plastic chip electrode.



FigureS-2: Profilogram recorded from the graphene stacks by TEM.

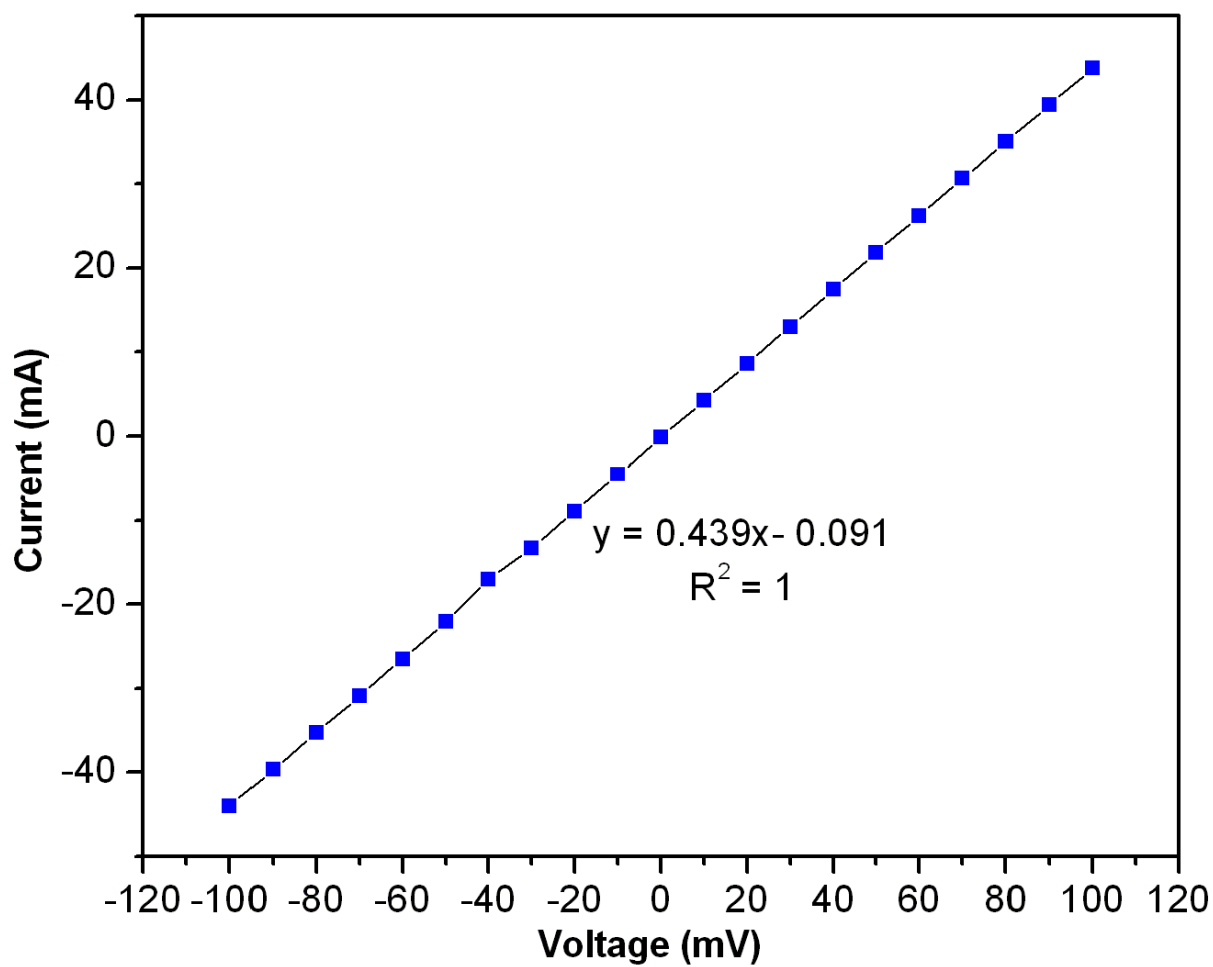


Figure S-3: I-V plot for plastic chip electrode.

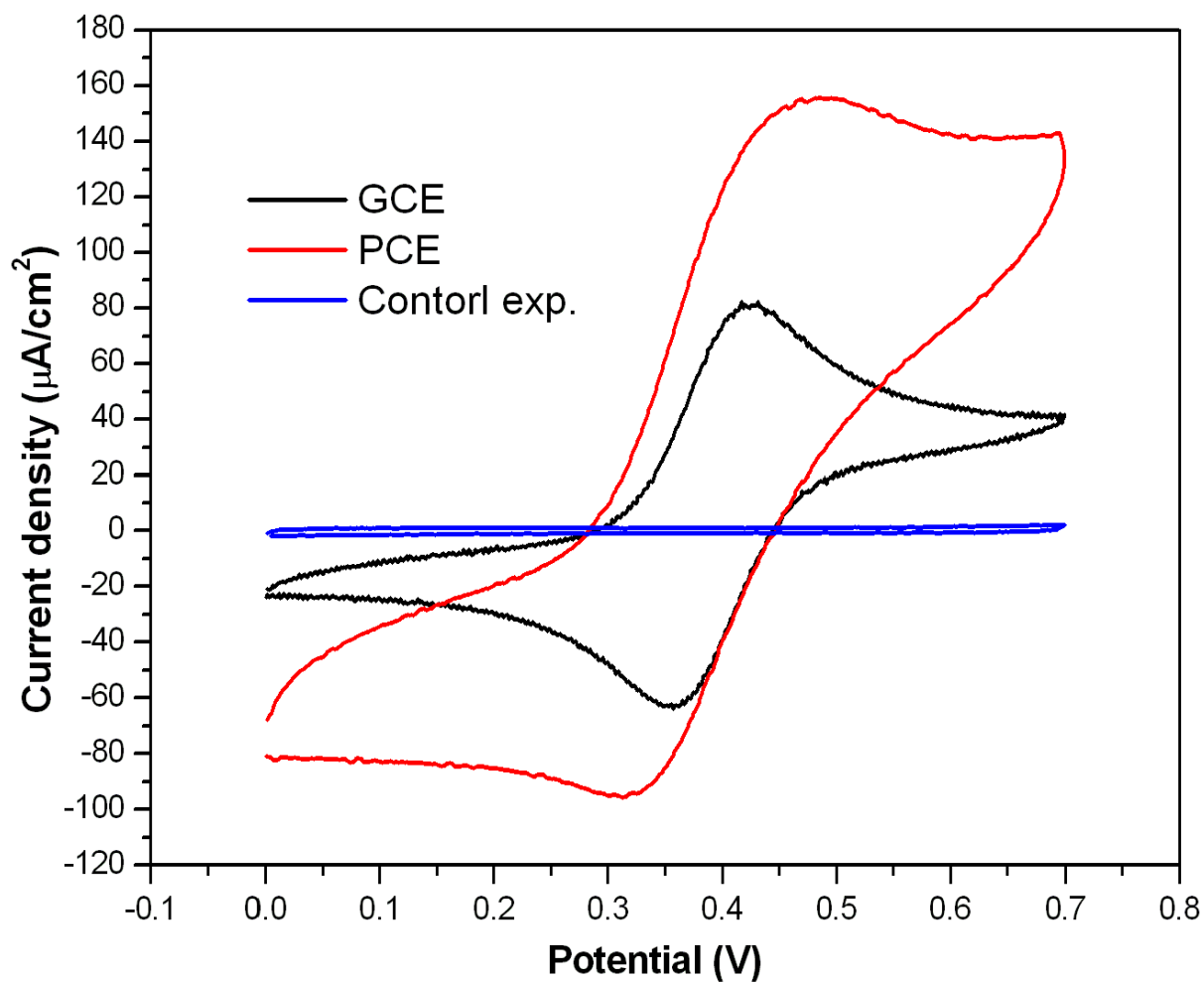


Figure S-4: Cyclic voltammogram of ferrocene/frocenium redox couple using plastic chip electrode (red curve) and glassy carbon electrode (black curve). Experimental condition: Working solution- 3mM ferrocene carboxylic acid in 0.1 M potassium nitrate, counter electrode- Pt, reference electrode- Ag/AgCl (sat KCl), scan rate- 100mV/s. The blue curve shows blank scan in supporting electrolyte without analyte using PCE.

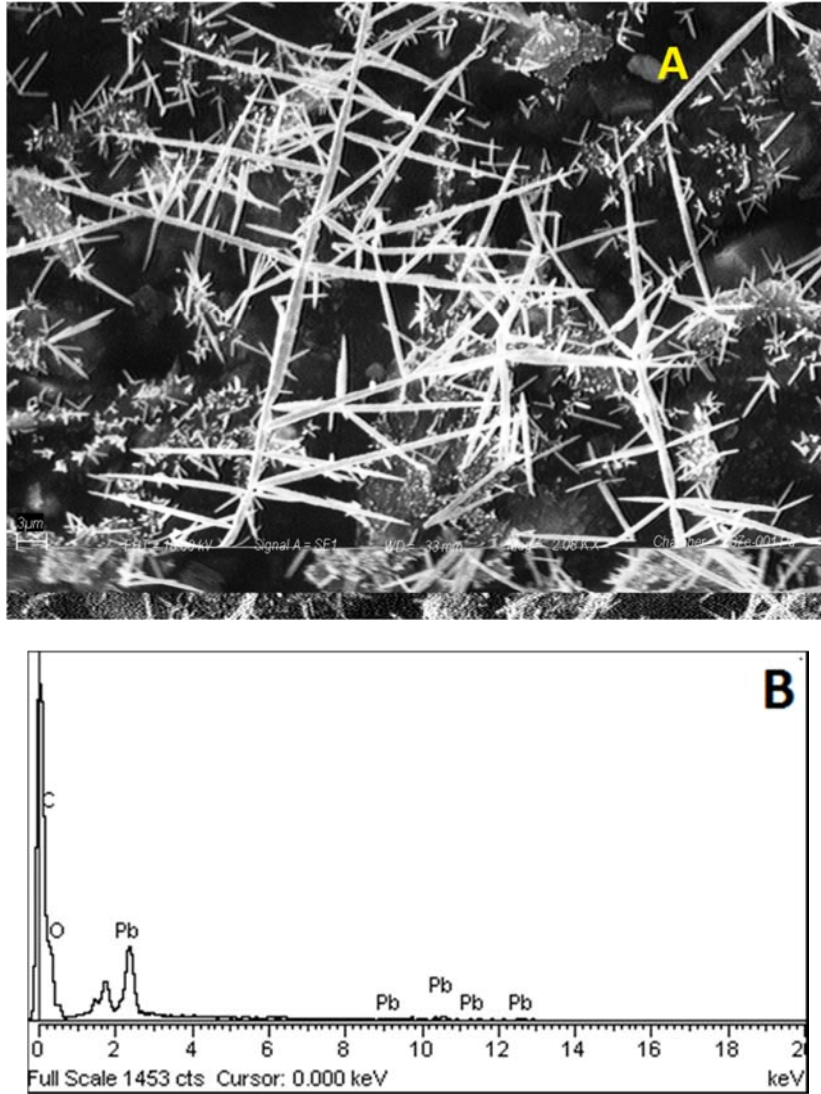


Figure S-5: (A) SEM image of plastic chip electrode after lead deposition; (B) EDX map of same showing presence of lead.

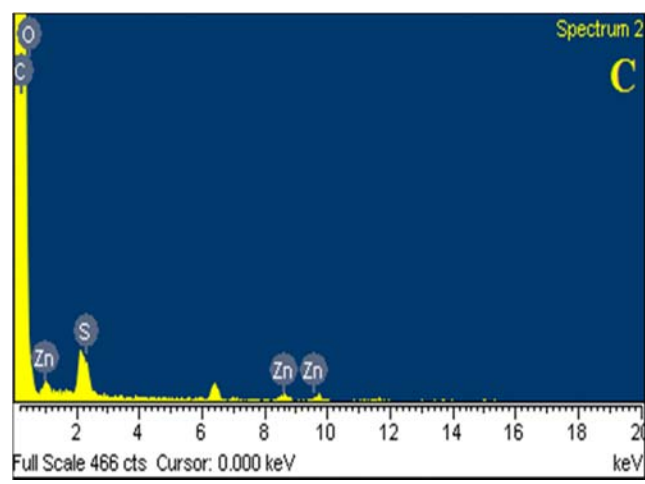
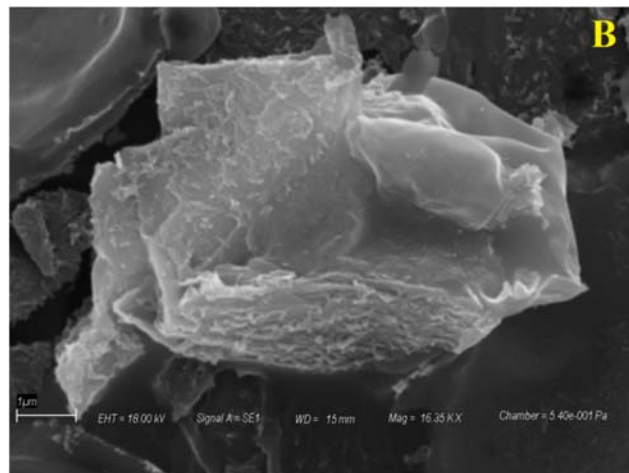
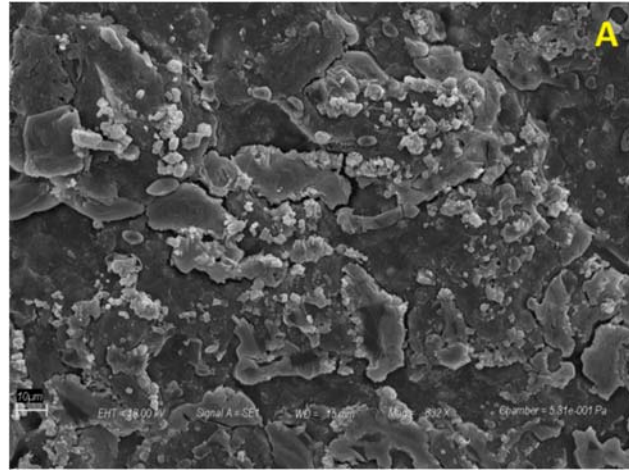


Figure S-6: SEM image of plastic chip electrode after zinc deposition. (A) Low resolution, (B) high resolution and (C) EDX spectra.

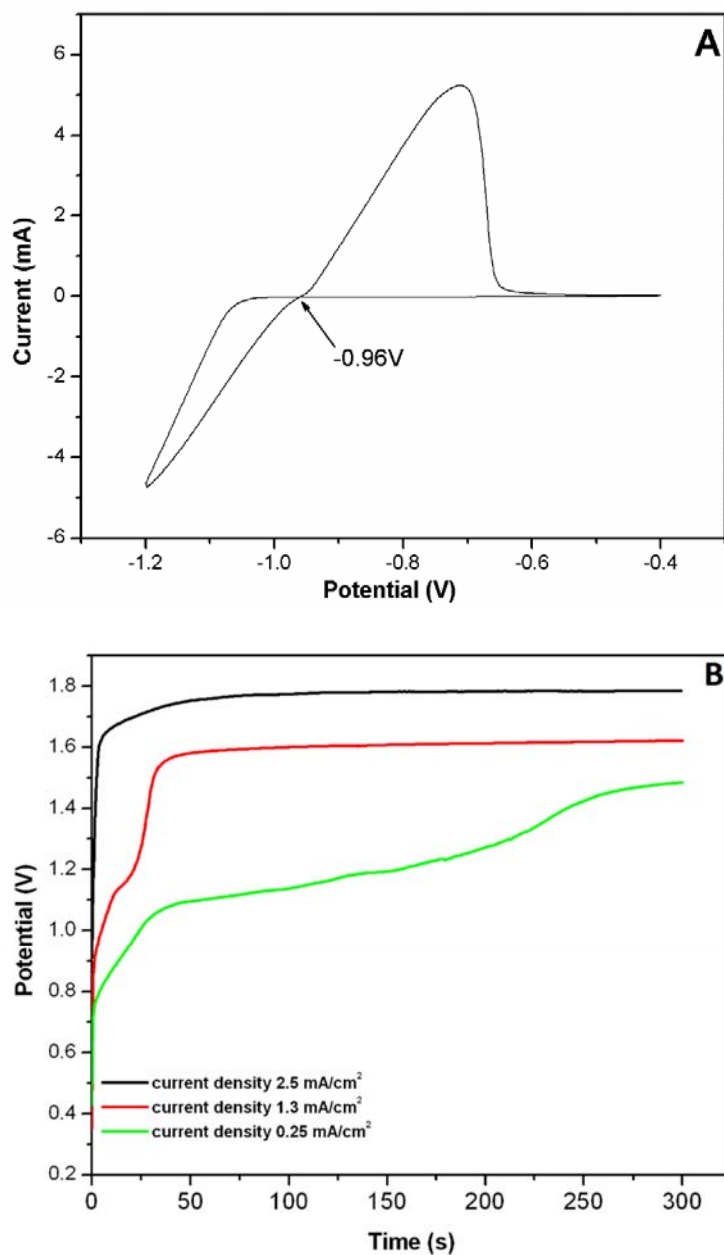


Figure S-7: Cyclic voltammogram of Zn^{+2} showing crossover potential (A) and chronopotentiometric curve for electrodeposition of zinc (B) on plastic chip electrode. Experimental condition: Working solution- kidd creek zinc electrolyte, Pt, reference electrode- Ag/AgCl (sat KCl), scan rate (for CV) - 100mV/s, current density (for electrodeposition) – 2.5, 1.3 & 0.5 mA/cm^2 (black, red and green respectively).

Table T-1: Physical properties of plastic chip electrode.

Parameters	Measurement technique	Value
Young's Modulus (E_{mod}) GPa	Tensile test	0.95 ± 0.1
Tensile Strength (σ_{ult}) MPa	Tensile test	20.5
Tensile Strain (ϵ^u) %	Tensile test	4.1
On set temperature ($^{\circ}\text{C}$)	TGA	346.2
Residual mass (M_{res}) %	TGA	56.99
Conductivity (mS/cm)	I-V measurement	19.75
Average roughness (nm)	AFM	4.775
Area peak-to-valley height (nm)	AFM	50.216

Table T-2: The redox parameters derived from the cyclic voltammogram of ferrocyanide/fericyanide; $[\text{Ru}(\text{bpy})_3]^{+2}/[\text{Ru}(\text{bpy})_3]^{+3}$ and ferrocene/ frocenium redox couples.

Scan rate	$[\text{Fe}(\text{CN})_6]^{+2/+3}$				$[\text{Ru}(\text{bpy})_3]^{+2/+3}$				ferrocene/ frocenium			
	E^0	ΔE	I_{pa}	I_{pc}	E^0	ΔE	I_{pa}	I_{pc}	E^0	ΔE	I_{pa}	I_{pc}
5	0.270	0.092	147.10	-19.6	1.138	0.096	56.40	-12.11	0.375	0.110	52.41	-18.86
10	0.270	0.100	172.09	-53.2	1.140	0.100	70.40	-24.00	0.375	0.113	61.21	-28.60
25	0.275	0.110	233.52	-106.0	1.142	0.109	89.06	-38.37	0.382	0.115	77.54	-42.42
30	-	-	-	-	1.140	0.012	93.89	-42.46	-	-	-	-
50	0.273	0.126	294.55	-153.5	-	-	-	-	-	-	-	-
75	0.271	0.141	325.30	-189.6	1.141	0.129	123.14	-66.42	0.389	0.122	111.45	-66.30
100	0.273	0.147	369.51	-217.0	1.143	0.133	137.87	-71.21	0.394	0.128	124.33	-74.45
150	0.273	0.154	419.89	-264.5	1.144	0.140	158.99	-81.15	0.408	0.144	154.80	-97.38
200	0.278	0.164	483.80	-292.4	1.145	0.142	175.86	-90.92	-	-	-	-
300	0.279	0.169	553.42	-353.4	-	-	-	-	0.407	0.154	217.60	-146.40
500	-	-	-	-	-	-	-	-	0.418	0.168	281.90	-202.30