Supporting information

Waterproof Flexible Polymer Functionalized Graphene Based Piezoresistive Strain Sensor for Structural Health Monitoring and Wearable Devices

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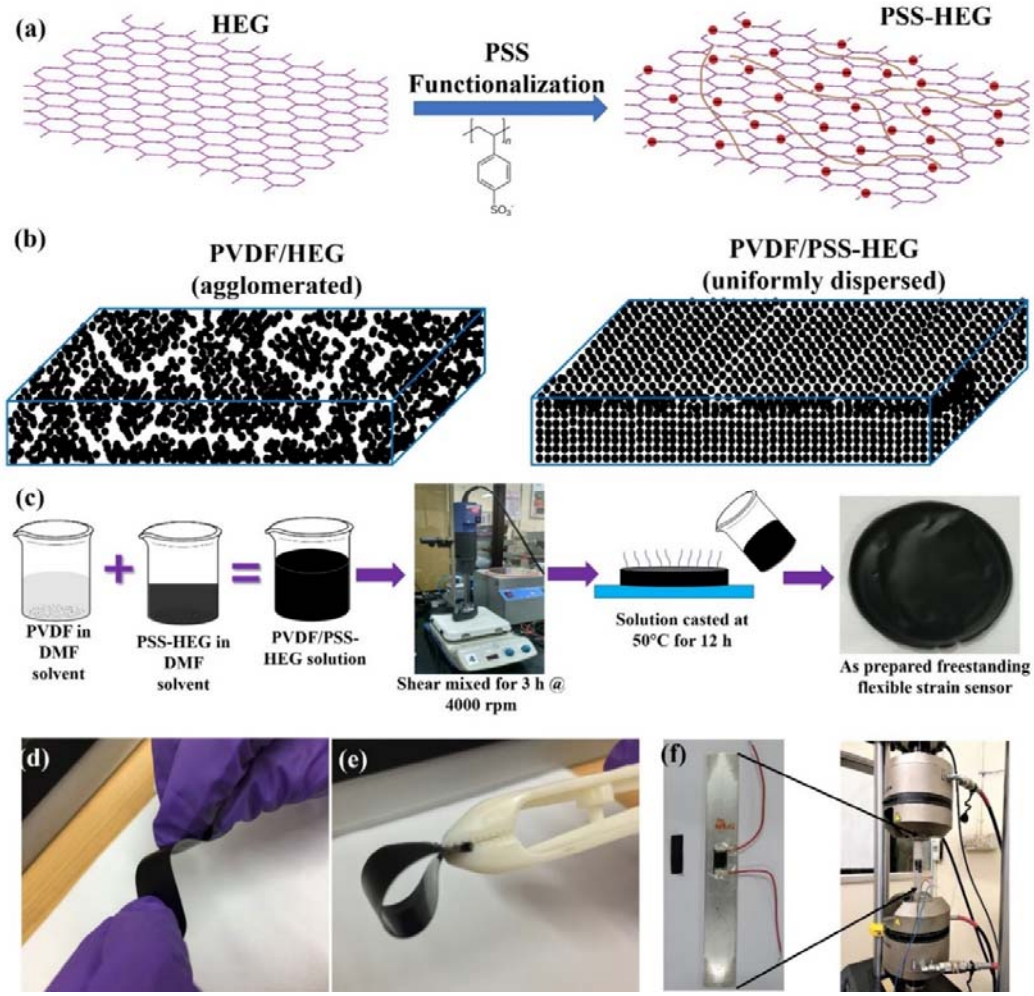

Figure S1 (a). Schematic of PSS polymer functionalization of the HEG, (b) schematic of dispersion of pristine HEG and PSS-HEG in PVDF matrix, (c) synthesis procedure of PVDF/HEG polymer nanocomposite based freestanding flexible strain sensor, (d, e) digital image to show the flexibility and robustness of the developed strain sensor and (f) fabricated strain sensor on the aluminium specimen which is under uniaxial tensile loading.

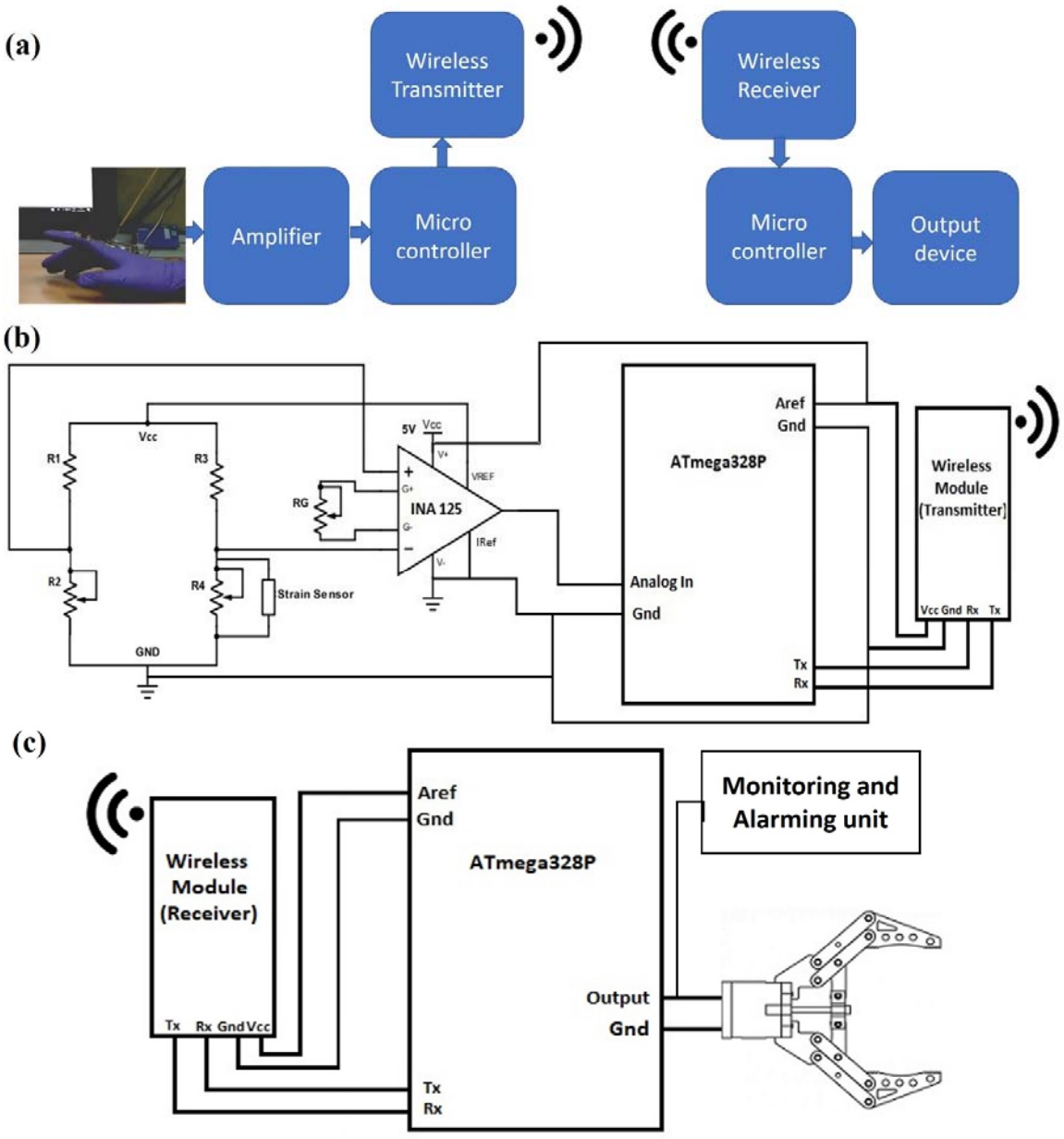

Figure S2. (a) Schematic of the wireless portable interfacing unit, (b) circuit diagram of the sensor interfacing and transmitting module and (c) circuit diagram of receiver module along with monitoring and alarming unit and actuator (robotic arm).

Table S1. The Electrical Conductivity of the PVDF/HEG and PVDF/PSS-HEG for Different Concentrations

Wt%	**PVDF/HEG**				**PVDF/PSS-HEG**			
	1st	**2nd**	**3rd**	**Mean**	**1st**	**2nd**	**3rd**	**Mean**
0.5	6.53E-9	5.53E-9	4.93E-9	5.643E-9	2.9E-8	2.10E-8	1.635E-8	2.212E-8
1	7.03E-9	6.91E-9	5.91E-9	6.607E-9	3.801E-8	3.51E-8	3.162E-8	3.489E-8
1.5	7.31E-9	6.51E-9	5.41E-9	6.401E-9	4.8E-8	3.50E-8	1.676E-8	3.326E-8
2	5.04E-7	3.02E-7	1.33E-7	3.11E-7	1.02E-6	9.80E-7	3.271E-8	6.772E-7
3	5.81E-7	4.51E-7	2.31E-7	4.204E-7	1.82E-5	9.67E-6	5.318E-6	1.106E-5
4	3.04E-7	1.01E-7	6.99E-8	1.566E-7	0.202	0.183	0.141	0.17515
5	0.0029	0.0021	0.00162	0.00221	0.361	0.330	0.299	0.33011
6	0.0015	0.00201	9.32E-4	0.00148	0.422	0.322	0.196	0.31341
7	0.004	0.003	0.00247	0.00316	0.412	0.336	0.217	0.32161

[#] 1st, 2nd and 3rd are the different places on the polymer nanocomposite film along the longitudinal direction.