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SUPPORTING INFORMATION

Positive piezoresistive behavior of electrically conductive alkyl-functionalized graphene/polydimethylsilicone nanocomposites

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Table S1 The comparison of piezoresistive properties of G-ODA/PDMS and CNTs/PDMS composites.

	Percolation threshold	Pressure sensitivity	Repeatability	Hysteresis	Durability
G-ODA/PDMS composites	0.63 vol.%	Good	Excellent	Good	Excellent
CNTs/PDMS composites	1.0 vol. %	Excellent	Bad	Bad	Bad

The results clearly demonstrate that the G-ODA/PDMS composites show better piezoresistive properties than the composites filled by CNTs though the same fabrication procedures.

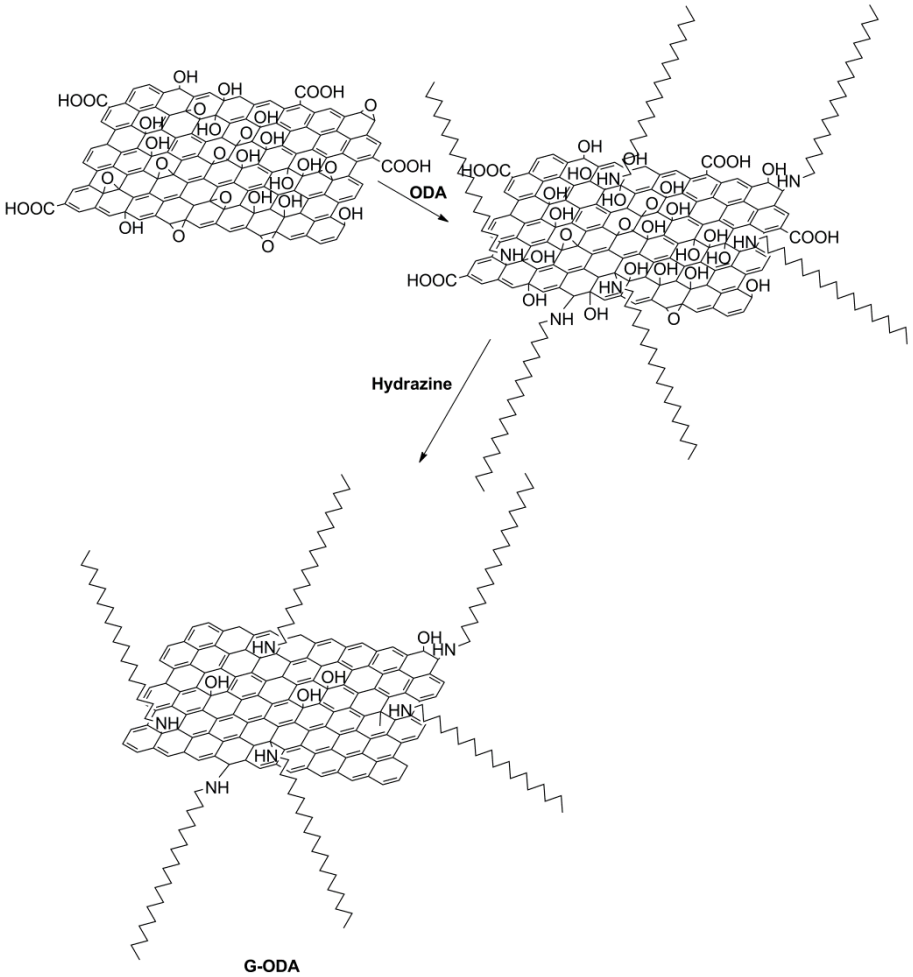

Figure S1. The schematic of the reaction process of G-ODA.

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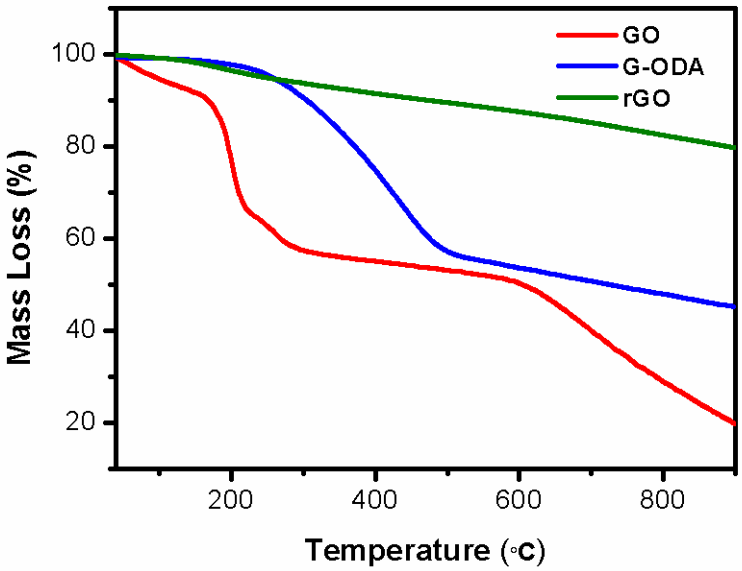

Figure S2. TGA curves of GO, G-ODA and reduced GO (rGO)with the heating rate of 10 °C/min from room temperature to 900 °C under N_2.

Figure S2 represents thermogravimetric analysis (TGA) curves of GO, G-ODA and reduced GO (rGO). The TGA curve of GO exhibits a two-step mass loss process. The first one occurred at around 200 °C corresponds to the loss of functional groups such as carboxylic acid and hydroxyl groups. While the second one started from 600 °C is mainly caused by the degradation of carbon backbones. In comparison, the TGA curve of rGO only shows a small weight loss of about 20 % at 900 °C, indicating that most of the functional groups on GO surfaces have been eliminated successfully. The weight loss of G-ODA is further enhanced after the functionalization, which is about 43 % at 500 °C. Based on the increment of weight loss from rGO to G-ODA, it can be calculated that the weight fraction of ODA in G-ODA hybrids is about 37 %.

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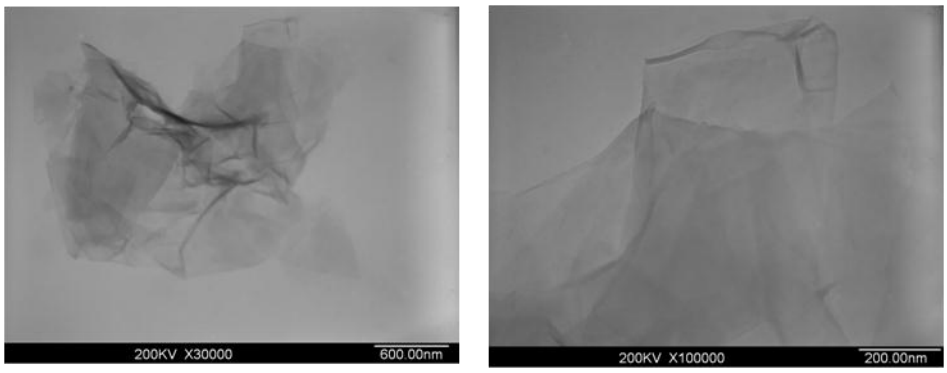

Figure S3. TEM images of G-ODA nanosheets.

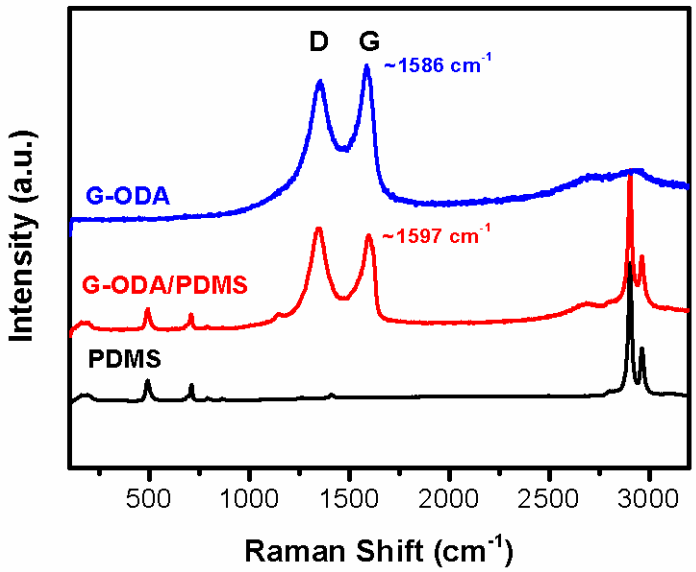

Figure S4. Raman spectra of PDMS, G-ODA, and G-ODA/PDMS composite with the G-ODA content of 1.19 vol. %.

In the spectrum of G-ODA, two peaks at ~1349 and ~1586 cm^{-1} can be observed, which are assigned to the well-known *D* and *G* bands of graphene. It is interesting to note that in the spectrum of G-ODA/PDMS composite the *G* band is blue shifted by about 11 cm^{-1}, suggesting that a strong interaction between the filler and the matrix exists.