Supporting Information

Three-dimensional graphene composite material doped with Grpahene-SiO_2 nanoballs and its potential application in stress sensors

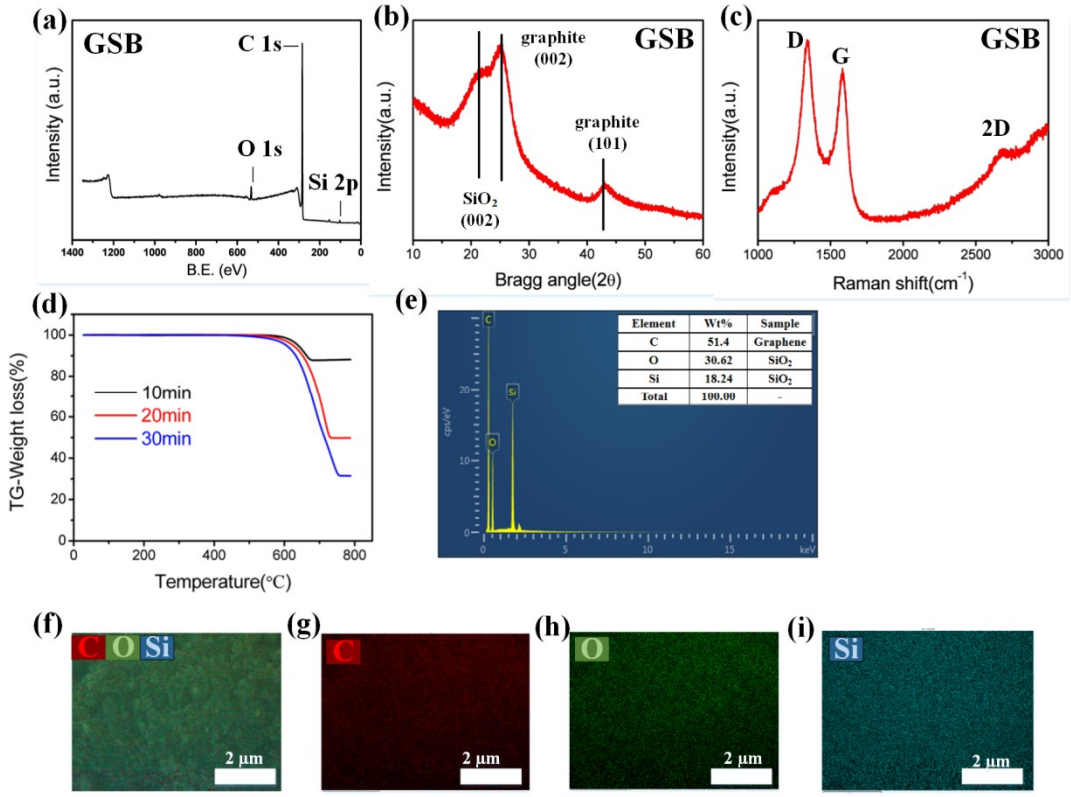

Figure S1. The characterization of GSB sample prepared with GO: SiO_2 ratio of 10:1 in 20 minutes (a) XPS spectrum of GSB (b) XRD spectrum of GSB (C) Raman spectrum of GSB. (D) TGA curve of GSB nanoparticles with different synthesis times. (e) Elemental content analysis of GSB. (f to i) EDS mapping of GSB in C, O, and Si elements, where C is assigned to graphene, and O and Si represent SiO_2.

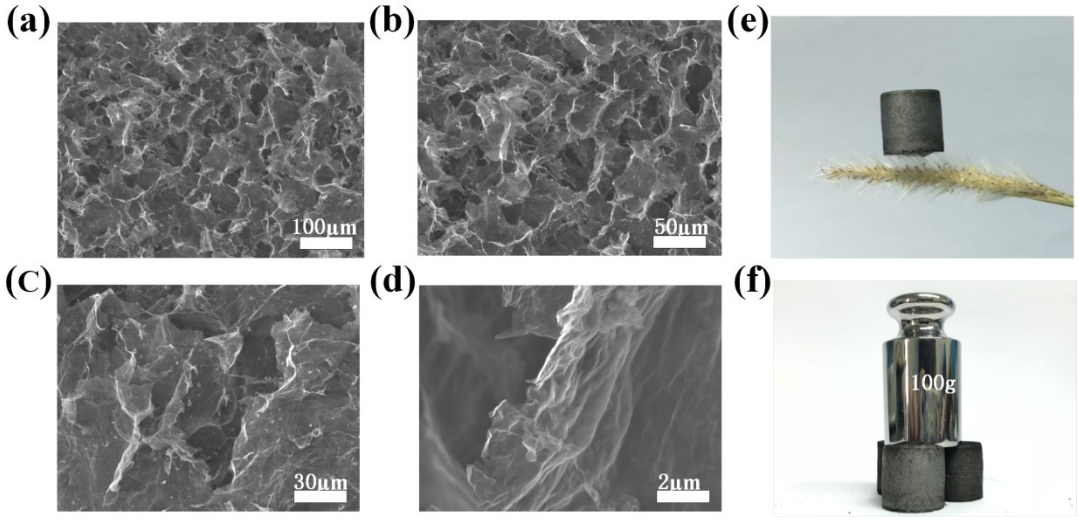

Figure S2. (a, b, c and d) SEM images of GSBF composites in different scales. (e) Photograph of GSBF sample which is light enough to stand on the tomentum. (f) Photograph of GSBF sample stressed by 100 g weight without visible strain.

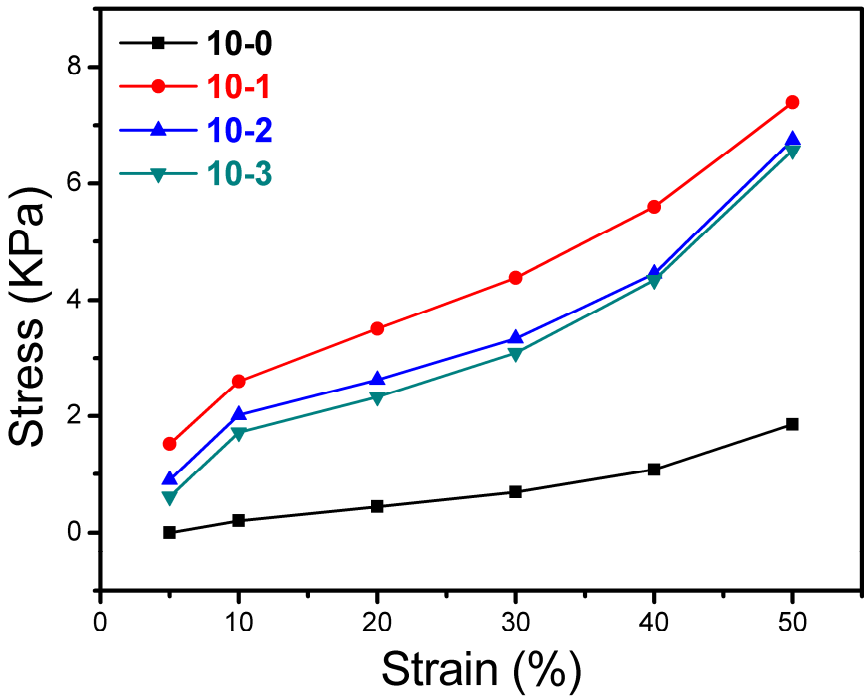

Figure S3. The stress-strain curves of GSBF with GO: GSB ratios of 10:0, 10:1, 10:2, and 10:3.

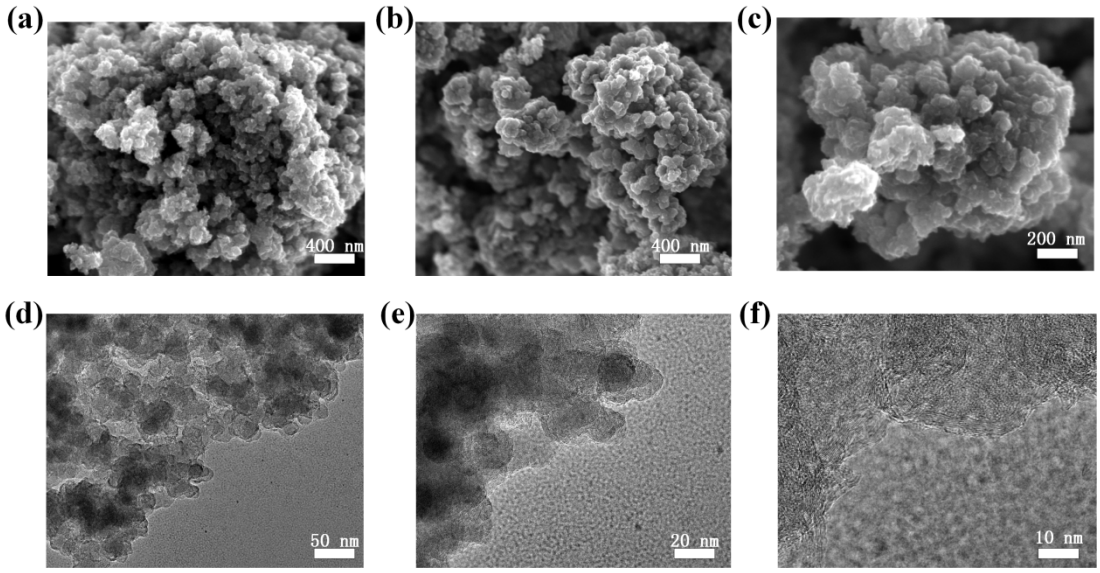

Figure S4. (a, b, c) SEM images of GSB sample. (d, e, f) TEM images of GSB sample.

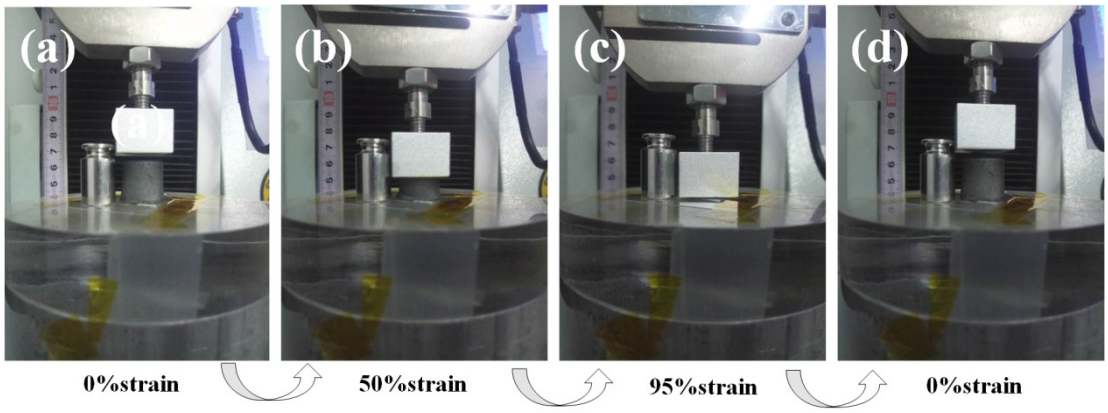

Figure S5. Photographs of GSBF material during the compression and recovery process with maximum strain of 95%.

Table S1. Properties of different graphene composite-based sensors

No.	Material	Stress range (kPa)	Sensitivity (kPa^{-1})	Ref.
1	Graphene foam	0-25	0.016	[1]
2	MWNT-rGO-PU foam	0-2.7	0.022	[2]
3	PAM hydrogel	0-3.2	0.05	[3]
4	PPy/CNT/PU	0-2	0.09	[4]
5	CNT/PDMS sponge	0-1	0.1	[5]
6	CB-PU	0-2.3	0.068	[6]
7	VACNT/PDMS	0-2	0.05	[7]
8	GF/CNT	0-2.5	0.19	[8]
9	rGO/PI	0-1.5	0.18	[9]
10	GO/PS/SDS	0-1.5	0.22	[10]
11	**This work**	0-10	0.14	-
		15-30	0.03	

Reference

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