Supplementary Information

Embedded 3D Printing of RGO Frameworks with Mechanical Strength, Electrical and Electromagnetic Interference Shielding Properties

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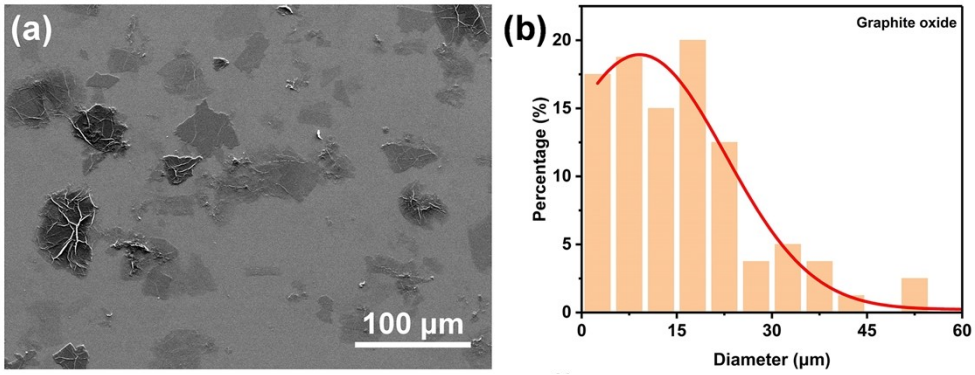

Fig. S1 SEM image (a) and size distribution (b) of graphite oxide sheets.

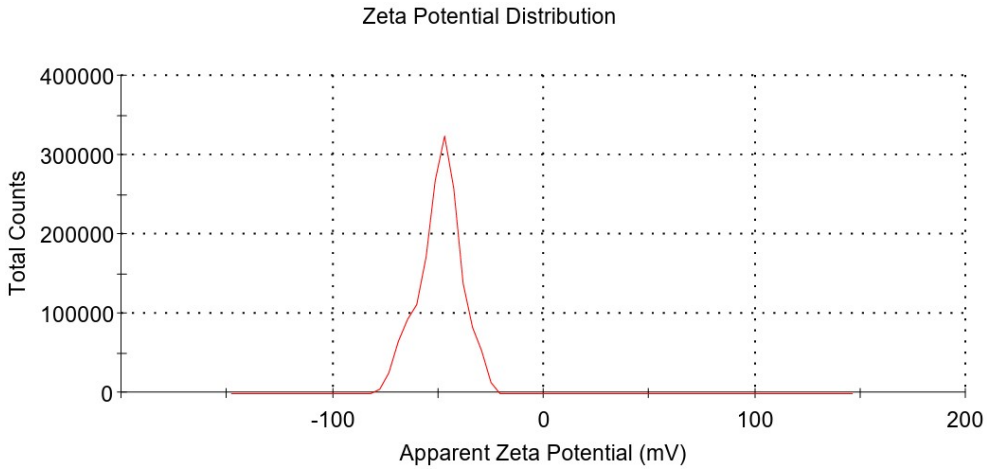

Fig. S2 Zeta potential analysis of graphite oxide dispersion.

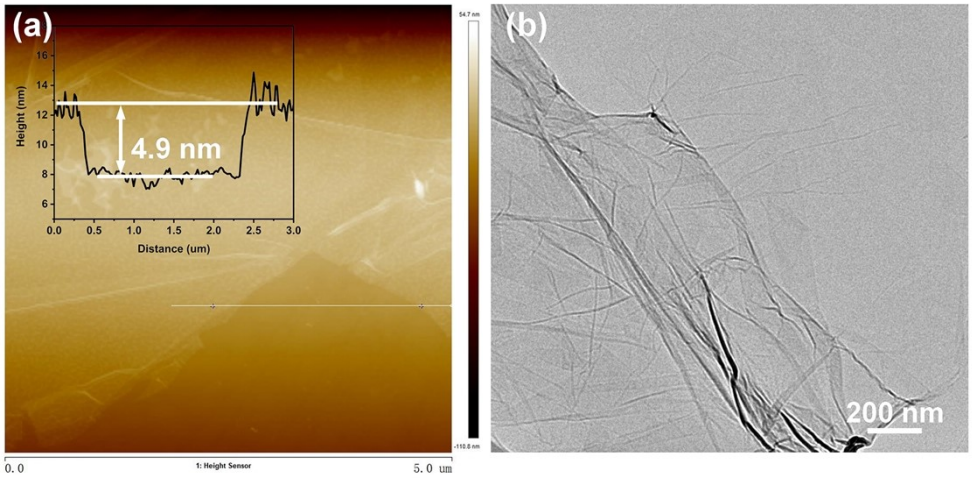

Fig. S3 AFM image (a) and HRTEM image (b) of the GO sheet.

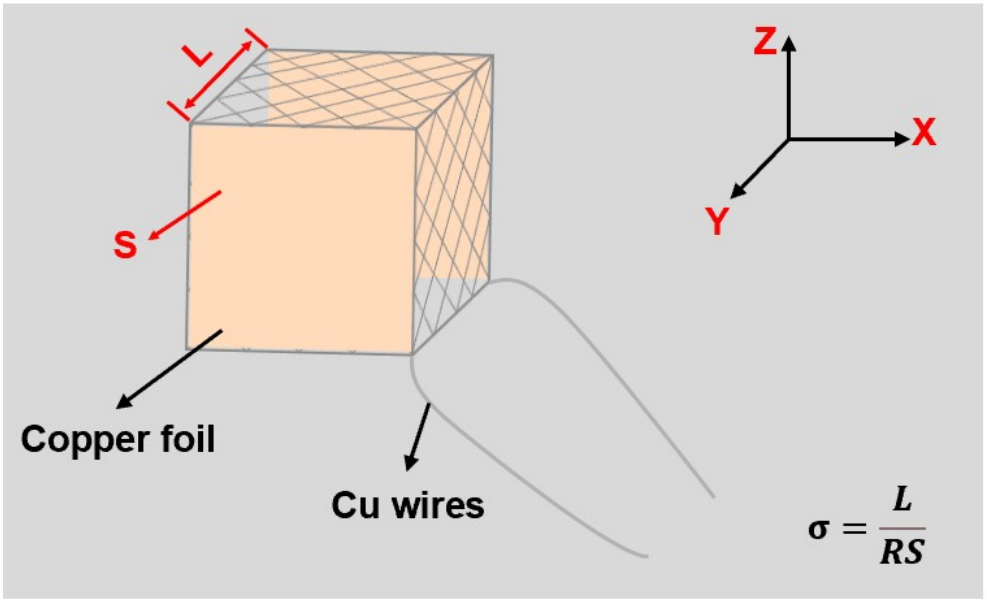

Fig. S4 Schematic diagram for testing resistance.

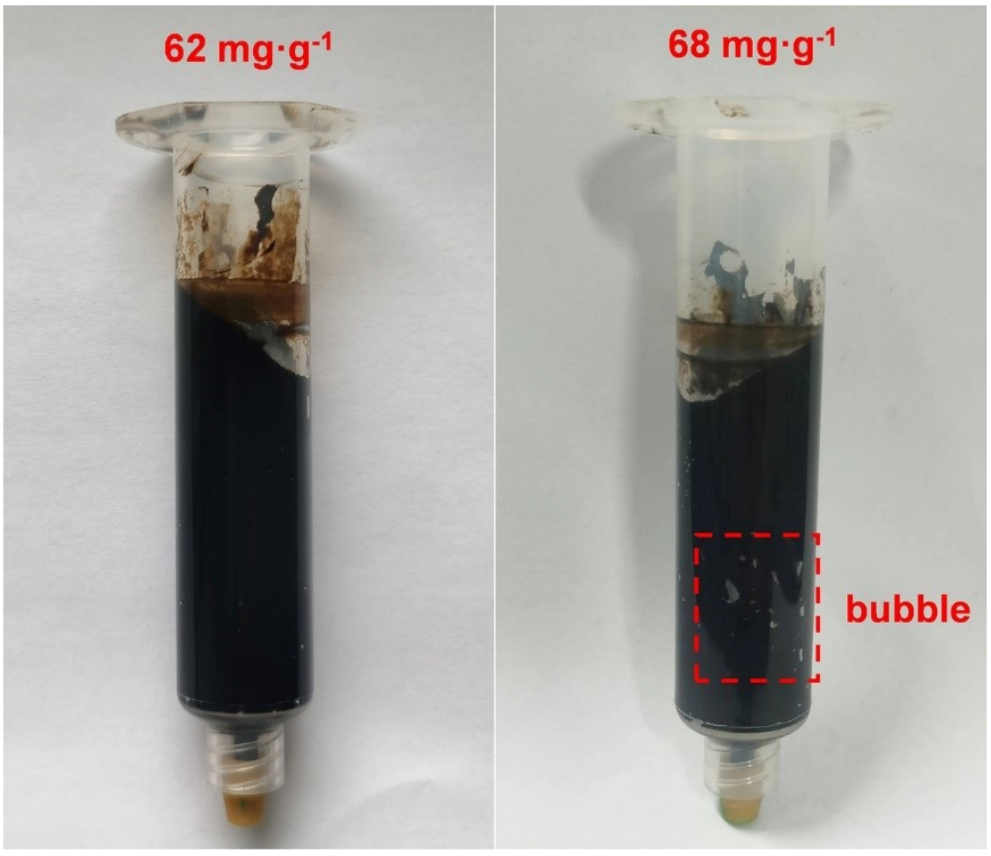

Fig. S5 Optical images of GO inks after defoaming.

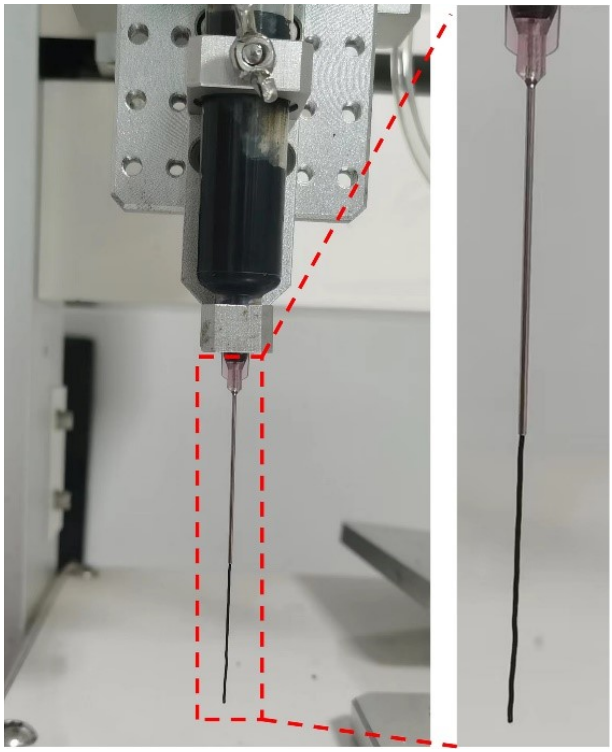

Fig. S6 Optical images of an extruded 62 mg·g^{-1} GO filament.

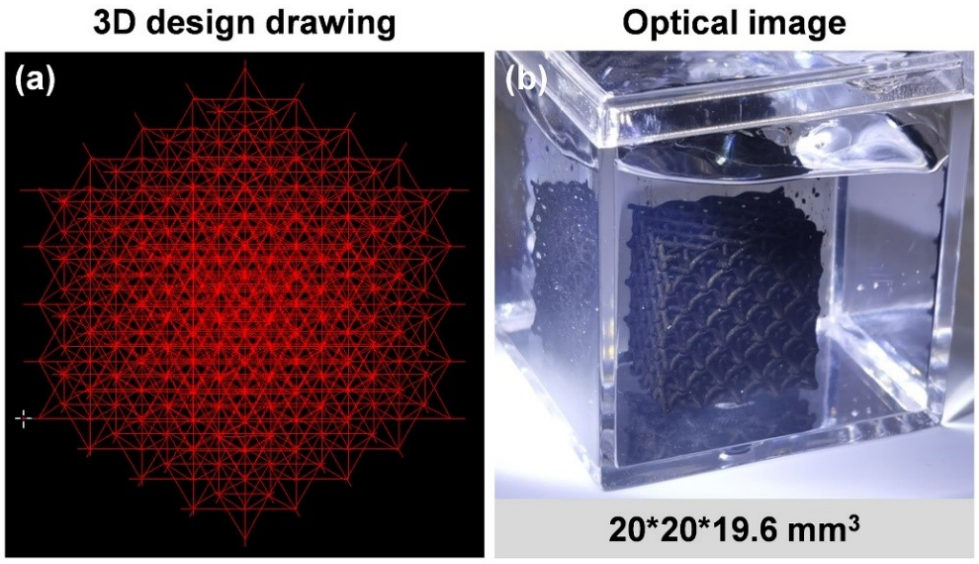

Fig. S7 3D design drawing (a) and optical image (b) of the printed framework.

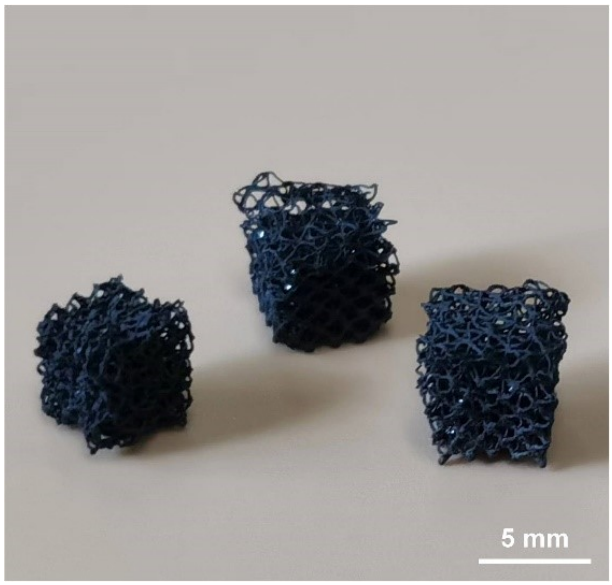

Fig. S8 The deformed C-RGFs are obtained by capillary self-assembly drying without hydrothermal treatment.

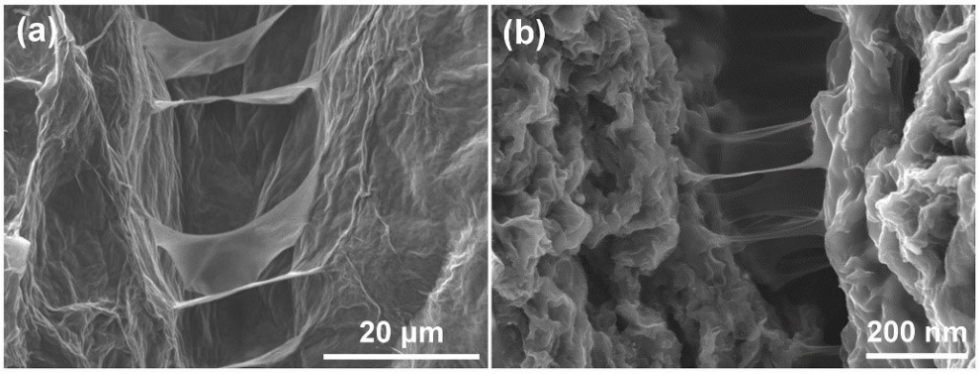

Fig. S9 SEM images of the cross-linking of graphene struts in F-RGF (a) and C-RGF (b).

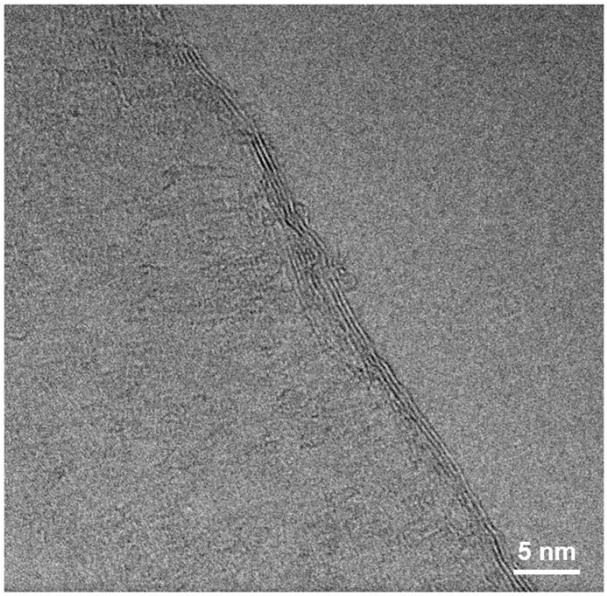

Fig. S10 HRTEM image of the graphene sheet.

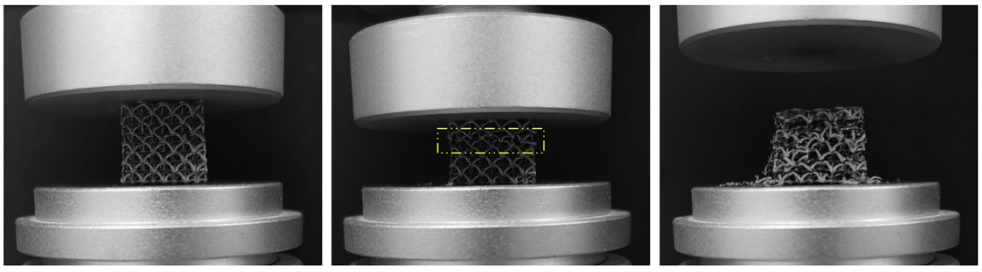

Fig. S11 Optical images of F-RGF during compression.

Table S1 Comparison of maximum compressive stress (σ) and related strain (ε) at maximum stress of 3D graphene assemblies.

Samples	ρ (mg cm^{-3})	ε (%)	σ (kPa)	Ref.
Graphene aerogel	15	50	73.9	[1]
Graphene aerogel	8.49	50	17.2	[2]
Graphene aerogel	14.9	50	10.4	[3]
Graphene aerogel	9.3	50	8.8	[4]
Graphene aerogel	17.3	50	4	[5]
F-PGF	14.89	50	35.42	This work
C-DGF	447.10	9	3230	This work

Note: ρ is the density of the sample.

Table S2 A comparative analysis of the EMI shielding properties of graphene-based materials.

Materials	Structure	t (mm)	SE_A (dB)	SE_R (dB)	SE_T (dB)	SE_A/t (dB mm^{-1})	SE_T/t (dB mm^{-1})	Ref.
Graphene/CNTs	Foam	2.4	47.92	6.51	54.43	19.97	22.68	[6]
Graphite/PDMS	Foam	4.5	32.00	3.50	35.50	7.11	7.89	[7]
Graphene/PDMS	Foam	1.0	12.50	2.50	15.00	12.50	15.00	[8]
GNPs/rGO/EP	Foam	3.0	42.30	8.70	51.00	14.10	17.00	[9]
Graphene/paraffin	Aerogel	2.5	38.12	5.17	43.29	15.24	17.32	[10]
Carbon/graphene	Aerogel	2.0	52.80	1.80	54.60	26.40	27.30	[11]
Graphene/PI	Aerogel	2.5	-	-	27.50	-	11.00	[12]
Graphene	Aerogel	2.5	35.40	4.80	40.20	14.16	16.08	[13]
Graphene/MXene	Aerogel	3.0	25.00	2.00	27.00	8.333	9.00	[14]
Graphene	3D scaffold	3.0	61.10	6.03	67.13	20.37	22.38	[15]
Graphene/PLA	3D scaffold	2.0	27.80	7.10	34.90	13.90	17.45	[16]
Graphene/MXene	3D scaffold	2.2	36.20	4.22	40.42	16.45	18.37	[17]
EGO/TOCNF	3D scaffold	2.5	49.80	5.80	55.60	19.92	22.24	[18]
C-RGF/PDMS	3D scaffold	1.6	36.10	8.14	44.23	22.56	27.64	This work
F-RGF/PDMS	3D scaffold	1.6	37.46	3.43	40.88	23.41	25.56	This work
C-RGF/PDMS	3D scaffold	2.2	48.75	7.00	55.75	22.16	25.34	This work
F-RGF/PDMS	3D scaffold	2.2	53.44	3.53	56.97	24.29	25.90	This work
C-RGF/PDMS	3D scaffold	2.8	49.30	6.44	55.74	17.60	19.91	This work
F-RGF/PDMS	3D scaffold	2.8	64.02	3.48	67.50	22.86	24.11	This work

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