

## Supplementary Information

### **Thiol-Functionalized Carbon Dot-Enabled Self-Catalytic Reduction-Dynamic Assembly for Constructing Three-Dimensional Porous Reduced Graphene Oxide Aerogels toward High-Performance Terahertz Modulation**

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## Supplementary Figures

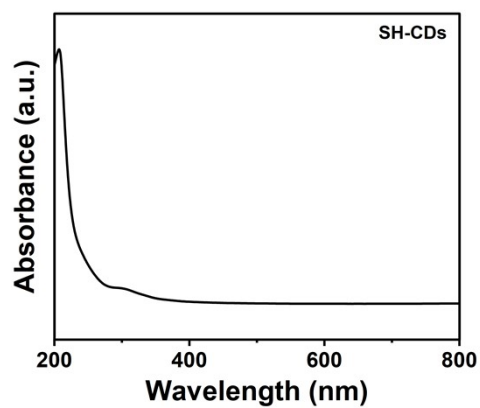


Figure S1. UV-vis absorption spectrum of SH-CDs.

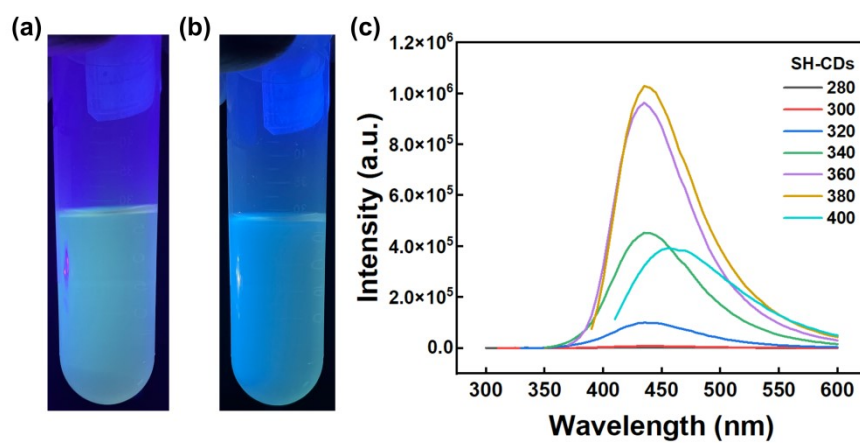


Figure S2. SH-CDs solution a) Fluorescence image under 365 nm excitation, b) Fluorescence image under 395 nm excitation, c) Fluorescence spectrum.

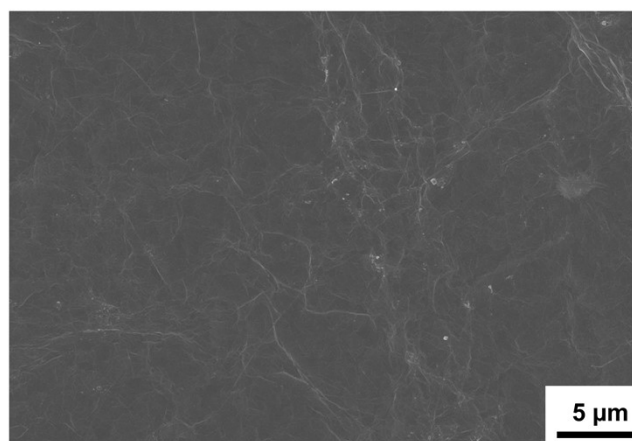
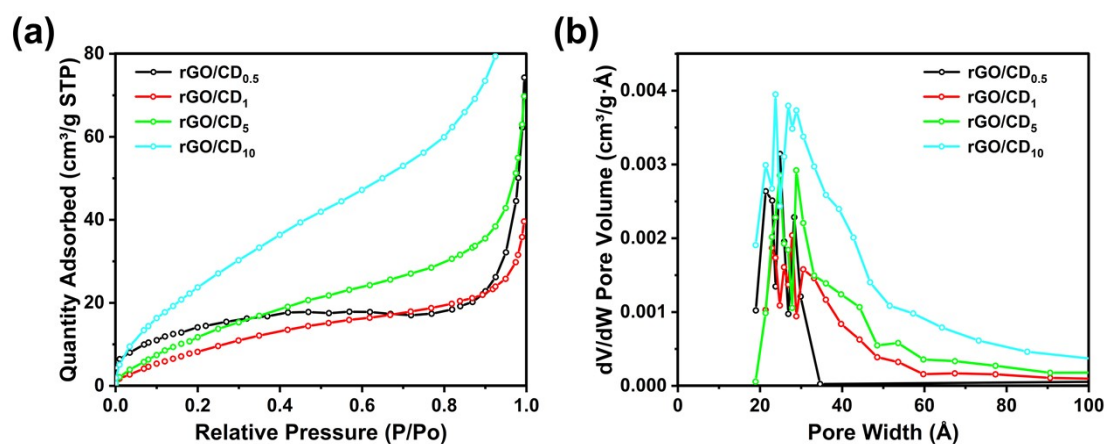
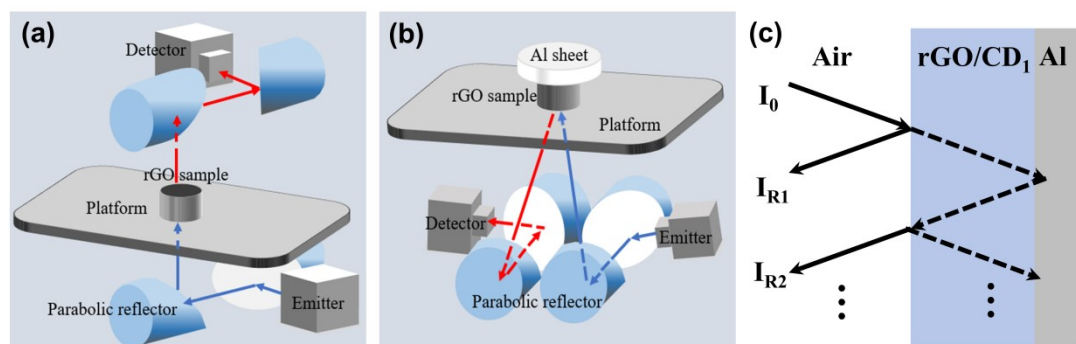


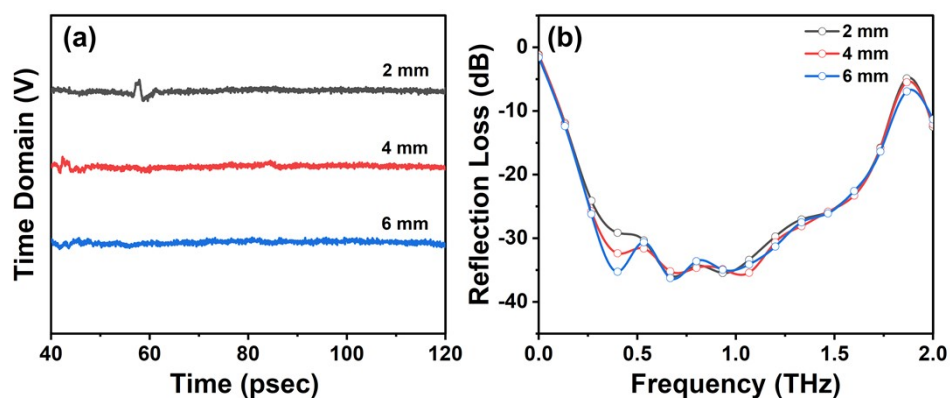
Figure S3. SEM of GO



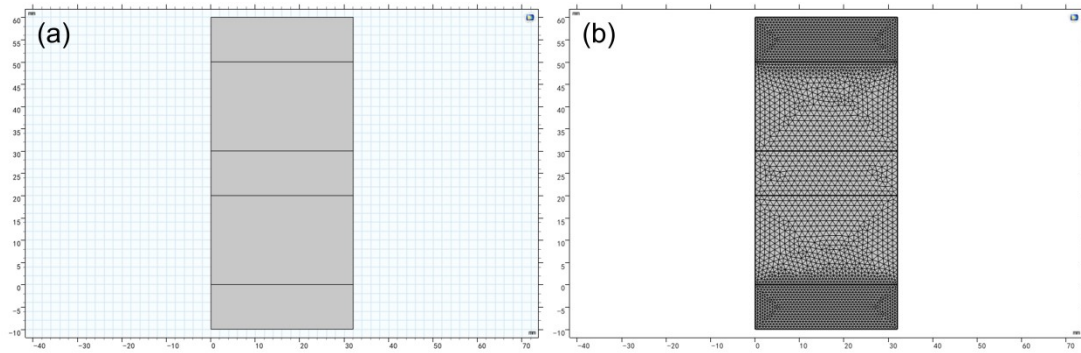
**Figure S4.** a) N<sub>2</sub> adsorption-desorption isotherms and b) BET pore size distribution of rGO aerogel



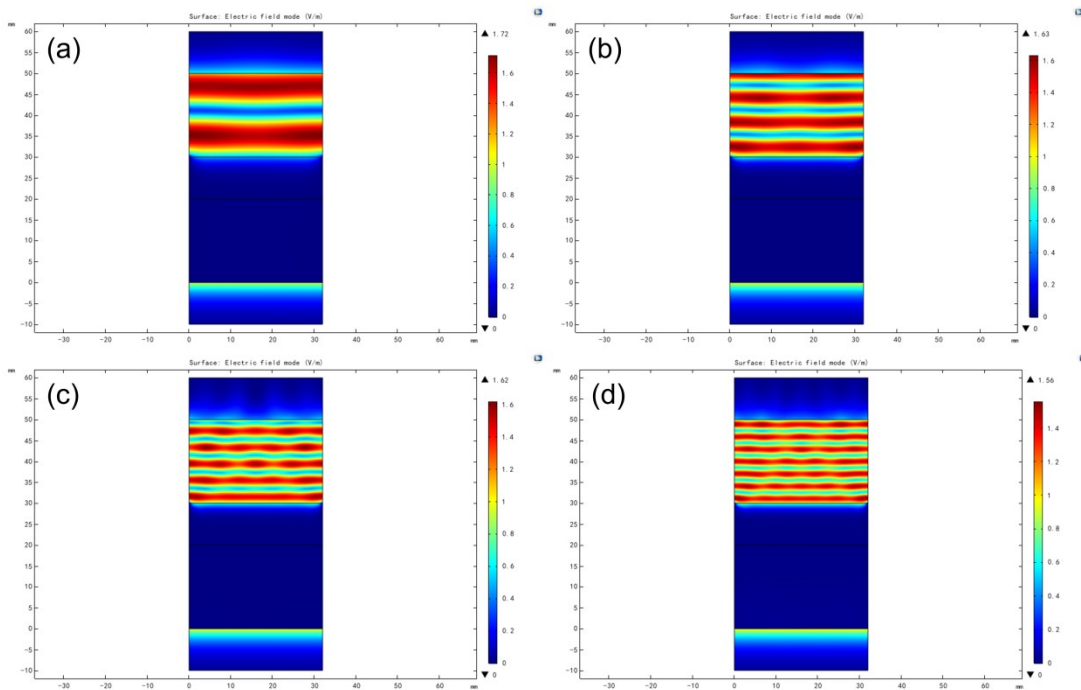
**Figure S5.** a) Schematic diagram of the THz-TDS system used for THz transmission experiments, b-c) Schematic diagram of the THz-TDS system used for THz absorption experiments.



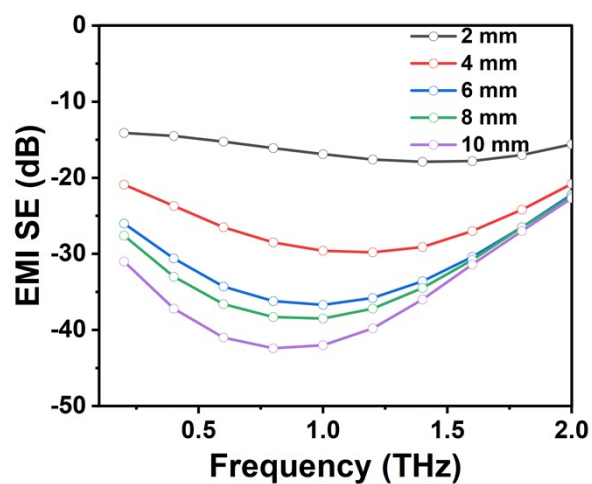
**Figure S6.** a) Reflection time-domain spectrum, b) Reflection loss of rGO/CD<sub>1</sub> with 2, 4, 6, 8, and 10 mm thickness.



**Figure S7.** Finite element simulation model of rGO aerogel: a) Schematic diagram of the model. b) Meshing.



**Figure S8.** Electric field intensity of the model after electromagnetic wave incidence: a-d) Electric field intensities of 4 mm rGO aerogel after being incident upon electromagnetic waves of 0.5 THz, 1 THz, 1.5 THz, and 2 THz.



**Figure S9.** The EMI SE simulation results of rGO aerogel with 2,4,6,8 and 10 mm thickness.

### Supplementary Tables

**Table S1.** Conductivity of GO and rGO aerogels doped with different amounts of SH-CDs solution.

Sample Name	Resistance ( $\Omega/\text{cm}$ )
GO	$8 \times 10^7$
rGO/CD <sub>0.5</sub>	330
rGO/CD <sub>1</sub>	240
rGO/CD <sub>5</sub>	1k
rGO/CD <sub>10</sub>	2.5k

**Table S2.** Calculation of the density of three-dimensional rGO/CD.

Sample Name	Weight/g	Height/cm	Bottom diameter/cm	Density/ $\text{mg} \cdot \text{cm}^{-3}$
rGO/CD <sub>0.5</sub>	0.0158	1.12	1.12	14.32
rGO/CD <sub>1</sub>	0.0146	1.32	1.11	11.43
rGO/CD <sub>5</sub>	0.0142	1.86	1.08	8.33
rGO/CD <sub>10</sub>	0.0148	1.97	1.09	8.05

**Table S3.** BET surface area and adsorption average pore diameter of rGO/CD.

Sample Name	BET Surface Area/m <sup>2</sup> ·g <sup>-1</sup>	Adsorption average pore diameter/Å
rGO/CD <sub>0.5</sub>	41.1877	66.3936
rGO/CD <sub>1</sub>	39.1449	62.5251
rGO/CD <sub>5</sub>	55.7388	77.3826
rGO/CD <sub>10</sub>	98.9739	89.2160

**Table S4.** Percentages of C, N and O atomic speciation in GO and rGO/CD<sub>1</sub>.

	Deconvoluted C 1s			Deconvoluted O 1s			C and O content	
	C-C/C=C	C-OH	C-O/C-N	O=C-O	C-O/O-H	O=C-O	C	O
<b>GO</b>	35%	23%	31%	11%	100%	/	69%	27%
<b>rGO/CD<sub>1</sub></b>	73%	/	27%	/	90%	10%	81%	10%