Supporting Information

Ultralight, Low Cost and Multifunctional CNT/CNF aerogels with Excellent EMI Shielding and Photothermal Conversion Properties

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Figures

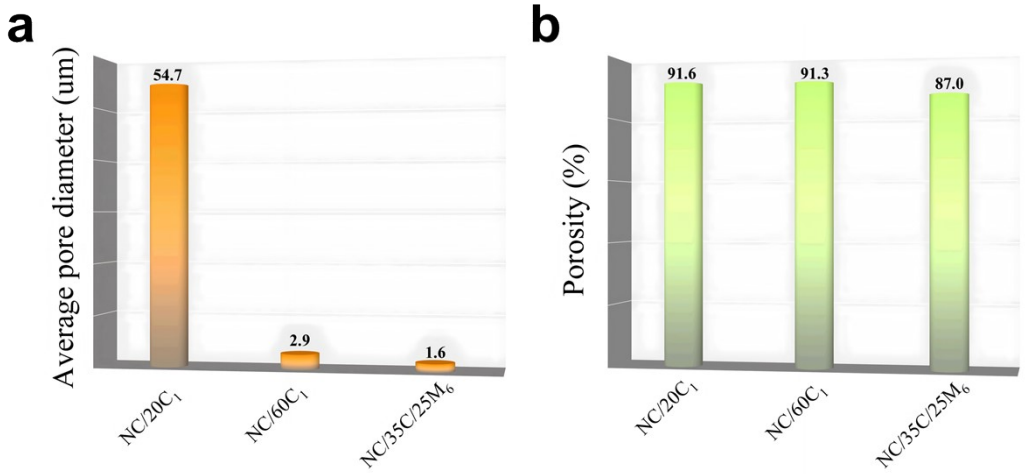

Fig. S1 a) Average pore diameter and b) Porosity of CNT/CNF aerogels.

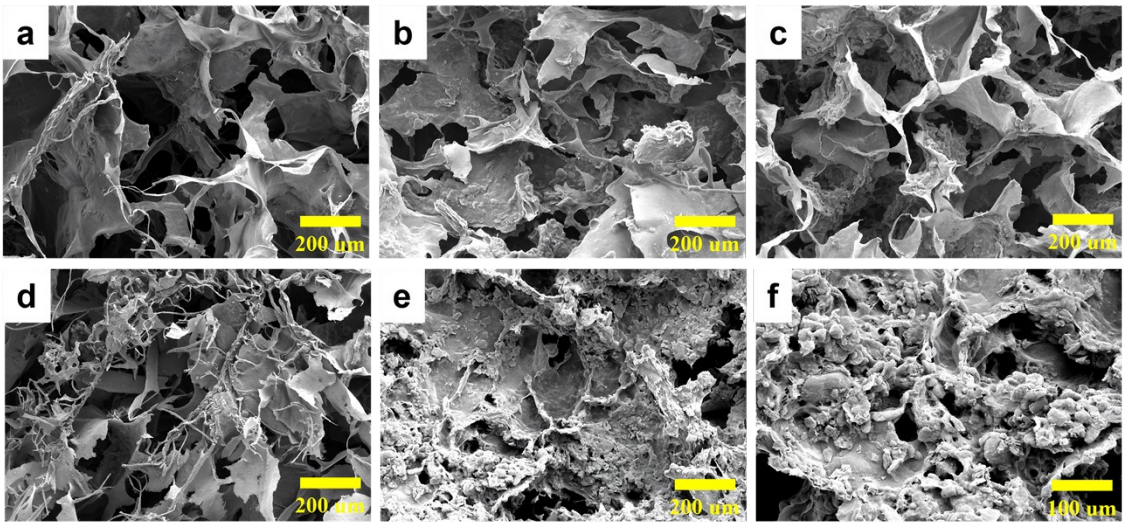

Fig. S2 SEM micrographs of the surfaces of CNT/CNF aerogels.

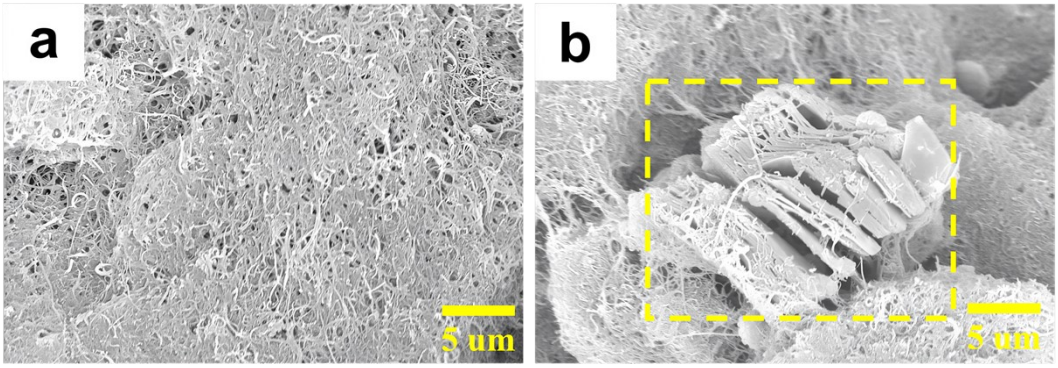

Fig. S3 The morphology of a) CNTs and b) MXenes.

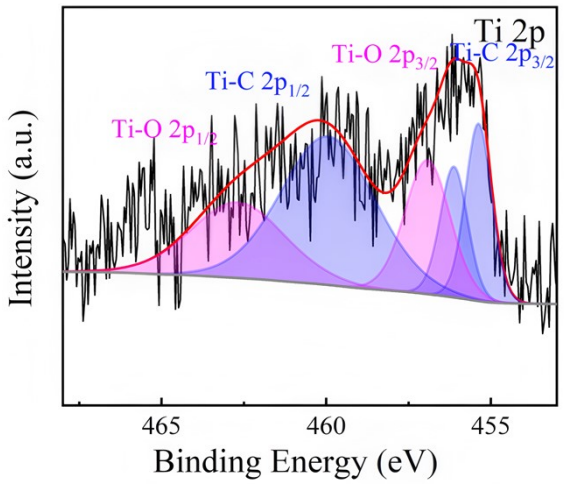

Fig. S4 Ti 2p curves of the $Ti_3C_2T_x$ MXene aerogel.

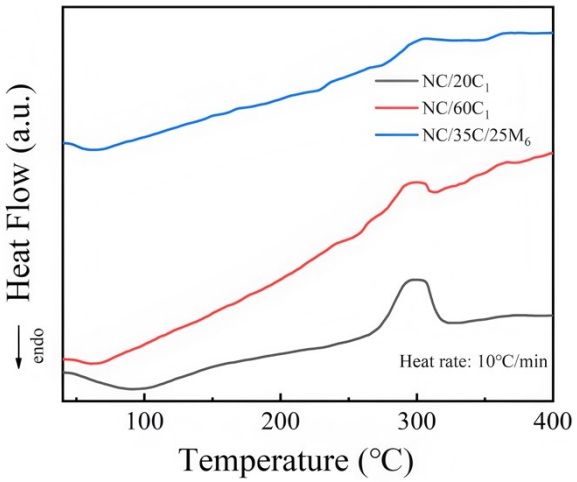

Fig. S5 DSC curves of $NC/20C_1$, $NC/60C_1$, and $NC/35C/25M_6$.

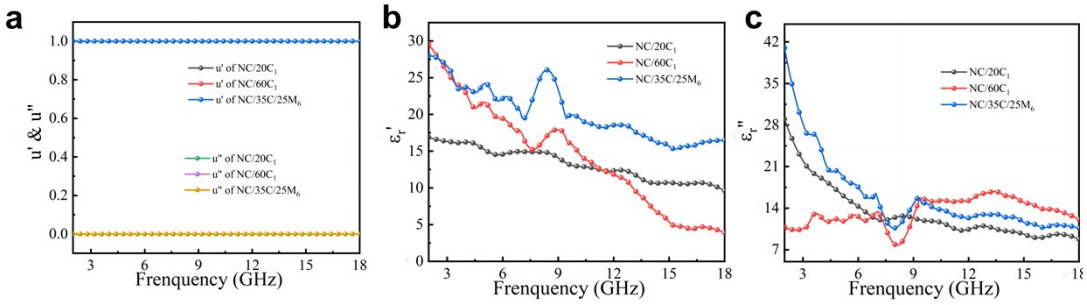

Fig. S6 a) $\mu_r^{'}$, and $\mu_r^{''}$, b) $\varepsilon_r^{'}$, and c) $\varepsilon_r^{''}$ curves of the aerogels of NC/20C$_1$, NC/60C$_1$, and NC/35C/25M$_6$.

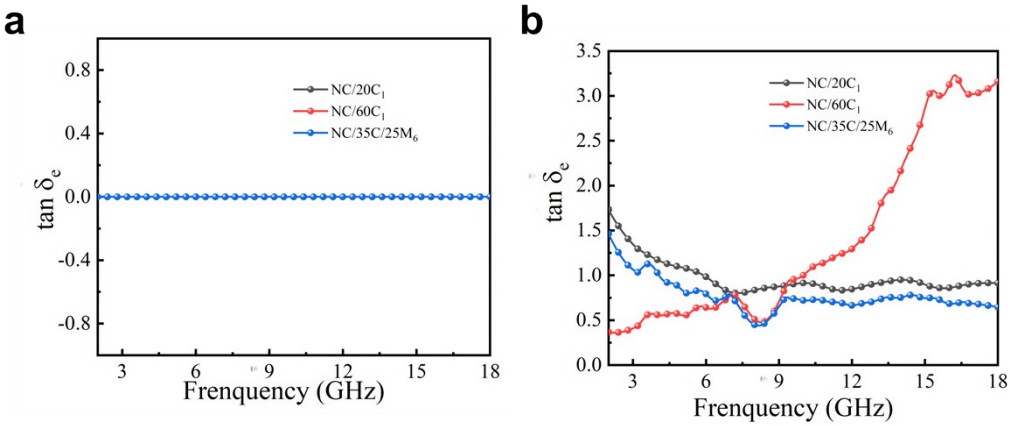

Fig. S7 tanδ_e values of a) NC/20C$_1$, b) NC/60C$_1$, and c) NC/35C/25M$_6$.

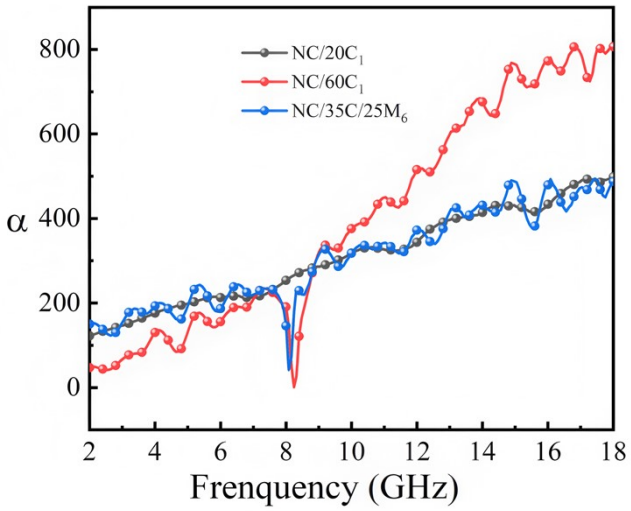

Fig. S8 The attenuation constants of NC/20C$_1$, NC/60C$_1$, and NC/35C/25M$_6$.

Tables

Table S1 The components of CNT/CNF aerogels.

	OH-NC	OH-CNT	MXene	PVP	Deionized water
NC/20C_1	0.227	0.061	-	0.015	30
NC/40C_1	0.152	0.121	-	0.03	30
NC/50C_1	0.113	0.152	-	0.038	30
NC/60C_1	0.075	0.182	-	0.046	30
NC/35C/25M_6	0.4775	0.6685	0.4775	0.2865	30

Table S2 The EMI shielding performance of different polymer composites reported in the literatures.

Sample	Thickness （mm）	Density (g cm^{-3})	EMI SE（dB）	SSE (dB cm^3 g^{-1})	SSE/t （dB cm^2 g^{-1}）	Ref.
Graphene/PI	0.8	0.27	18	67.84	848	1
WPU/MWCNT	2.3	0.07	35	492.89	2143	2
PS/MWCNT	2	0.53	30	57	285	3
EPDM/CB	2	0.60	18	30.2	151	4
ABS/CB	1.1	0.96	20	20.9	190	5
Epoxy/GNP/Fe_3O_4	2	0.68	25	37	185	6
PEO/CNT/Cellulose	0.15	1.7	35	20.55	1370	7
Ni/PVDF/$Ti_3C_2T_X$	0.1	1.66	19.5	11.78	1177	8
NC/35C/25M_6	2	0.06	30.3	505	2525	This work

Formulas

$$\alpha = \frac{\sqrt{2}\pi f}{c} \times \sqrt{\left(\mu_r''\varepsilon_r'' - \mu_r'\varepsilon_r'\right) + \sqrt{\left(\mu_r''\varepsilon_r'' - \mu_r'\varepsilon_r'\right)^2 + \left(\mu_r'\varepsilon_r'' + \mu_r''\varepsilon_r'\right)^2}} \#(S1)$$

$$RL(dB) = 20\log\left|\frac{Z_{in} - 1}{Z_{in} + 1}\right| \#(S2)$$

$$Z_{in} = \sqrt{\frac{\mu_r}{\varepsilon_r}}\tanh\left[j\left(\frac{2\pi}{c}\right)fd\sqrt{\mu_r\varepsilon_r}\right] \#(S3)$$

$$T = |S_{21}|^2 \#(S4)$$

$$R = |S_{11}|^2 \#(S5)$$

$$A + R + T = 1 \#(S6)$$

$$SE_A = -10\log\frac{T}{1-R} \#(S7)$$

$$SE_R = -10\log(1-R) \#(S8)$$

$$SE_T = SE_A + SE_R \#(S9)$$

References

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