Electronic Supplementary Material

Dual cross-linked MXene/cellulose nanofiber/nickel alginate film with improved mechanical properties and electromagnetic interference shielding performance

Pengcheng Deng, Shiyi Feng, Canhui Lu, Zehang Zhou (✉)

State Key Laboratory of Polymer Materials Engineering, Polymer Research Institute of Sichuan University, Chengdu 610065, China

E-mail: zzh303@scu.edu.cn

SUPPLEMENTAL FIGURES

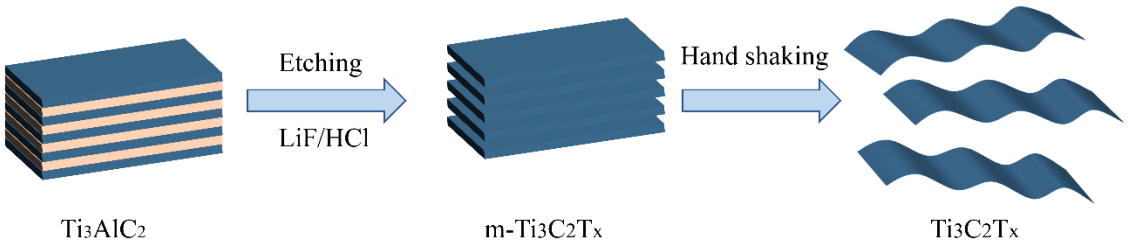

Fig. S1 Schematic of the preparation process of MXene.

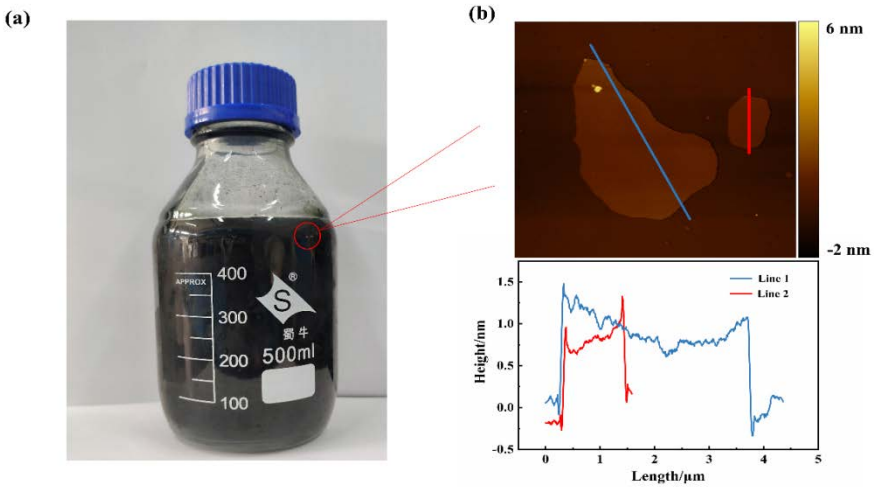

Fig. S2 (a) Photographs of MXene solution. (b) AFM image of delaminated-MXene nanosheets.

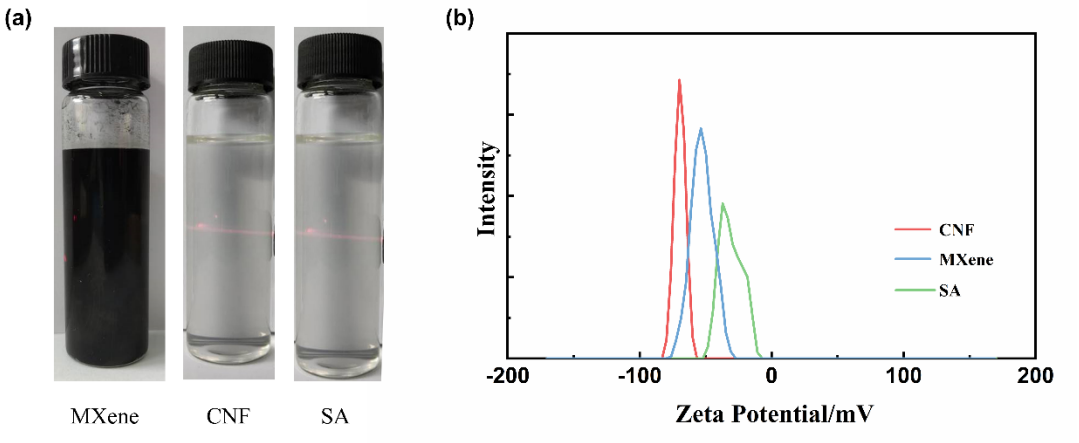

Fig. S3 (a) Photographs and (b) Zeta potential of MXene, CNF, and SA solutions.

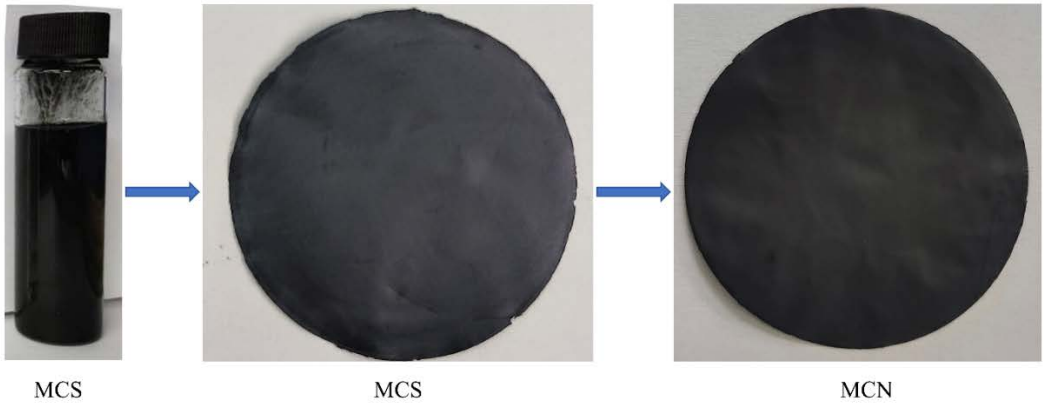

Fig. S4 Photographs of MCS solution , MCS film, and MCN film.

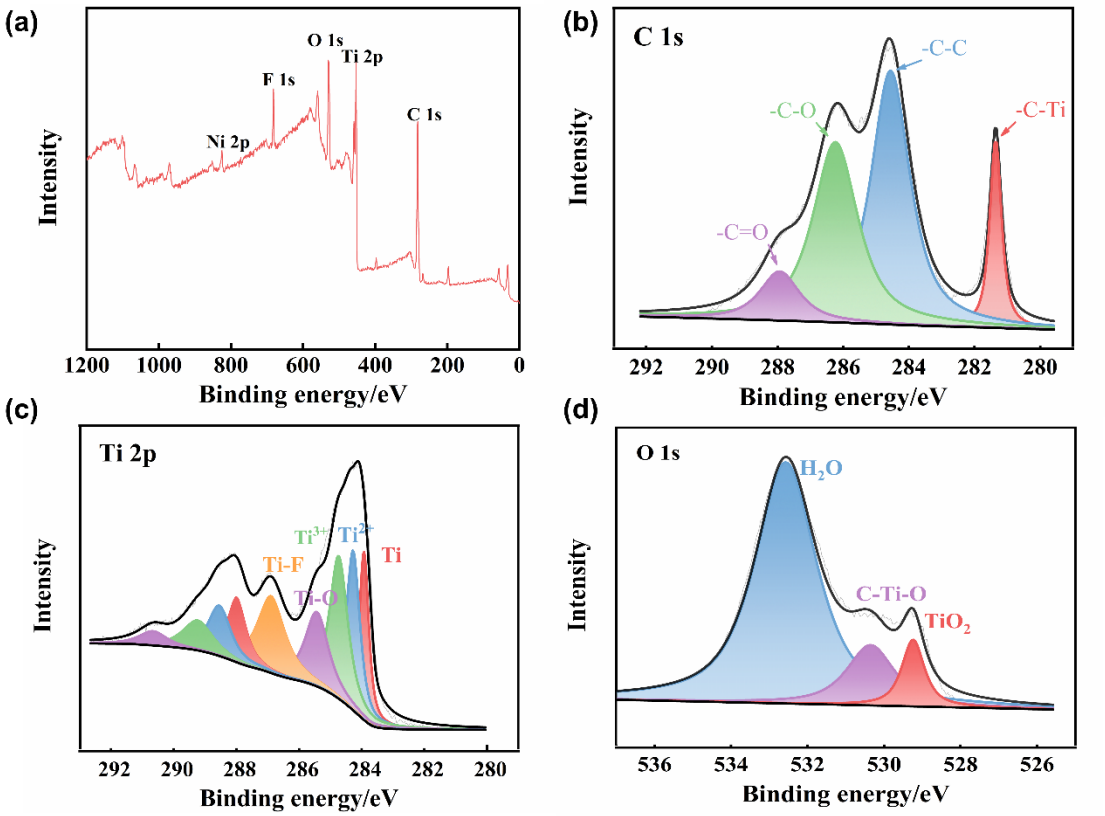

Fig. S5 (a) XPS spectra of MCN film. (b-d) XPS C 1s, Ti 2p, and O 1s spectra for MCN film.

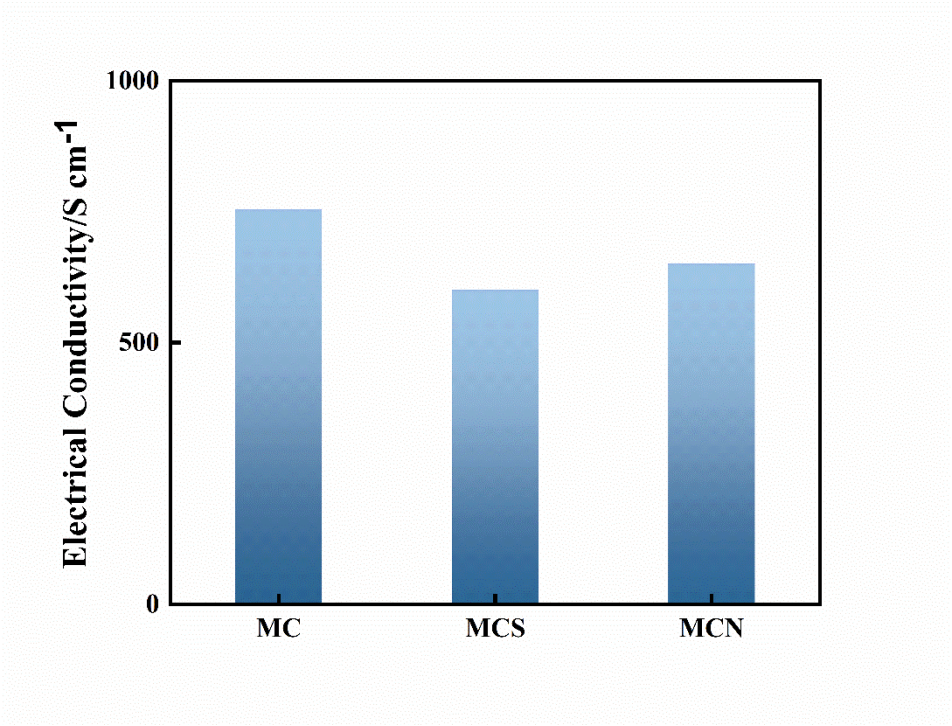

Fig. S6 Electrical conductivity of MC, MCS, and MCN films.

SUPPLEMENTAL TABLES

Table S1 The mechanical properties of MXene and MXene composite films.

Materials	Tensile strength (MPa)	Strain at fracture (%)	Young's modulus (GPa)	Toughness ($S\ m^{-1}$)
MXene	6.26	0.20	1.89	0.12
MCS	19.74	0.65	4.86	1.47
MCN	79.11	0.69	9.33	4.03

Table S2 The thickness and EMI shielding performance at 8.2 GHz of MXene composite films.

Materials	Thickness (μm)	SE_T (dB)	SE_A (dB)	SE_R (dB)
MC	32	42.06	36.40	5.66
MCS	30	44.17	37.84	6.33
MCN	29	47.17	38.53	8.64

Table S3 Comparison of the EMI shielding of the MXene composite films and other materials.

Number	Materials	EMI SE (dB)	Thickness (mm)	SSE/t ($dB \cdot cm^2 \cdot g^{-1}$)	Ref
1	MXene-CNF	40	0.035	7029	[1]
2	MXene-PVA	26	0.100	4770	[2]
3	MXene-CNF	32.7	0.047	4761	[3]
4	MWCNT/CNF	45.8	0.150	4017.3	[4]
5	MXene/SHCNF	45.02	0.040	4428.11	[5]
6	MC	42.06	0.032	6857	This work
7	MCS	44.17	0.030	7136	This work
8	MCN	47.17	0.029	7621	This work

References

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