

Supporting information

Silver nanowires intercalating $\text{Ti}_3\text{C}_2\text{T}_x$ MXene composite films with excellent flexibility for electromagnetic interference shielding

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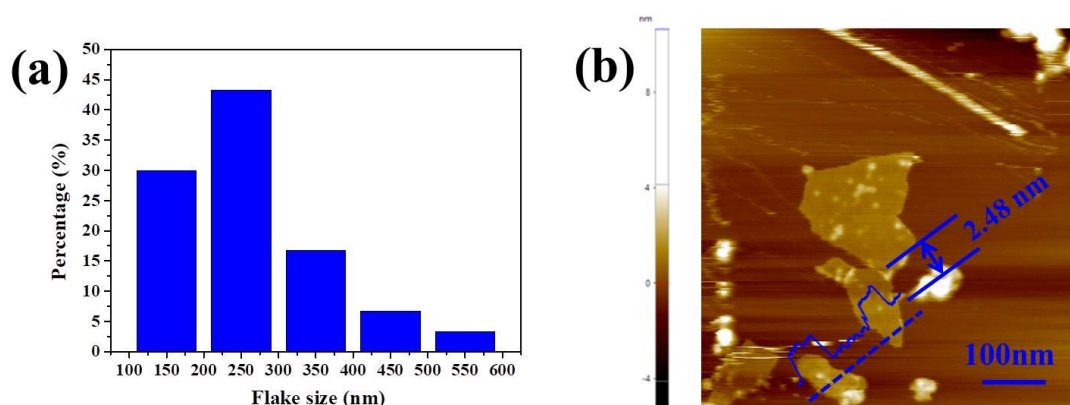


Fig. S1 Size dispersion (a) and AFM image (b) of $\text{Ti}_3\text{C}_2\text{T}_x$ sheets. Size dispersion was calculated from TEM image.

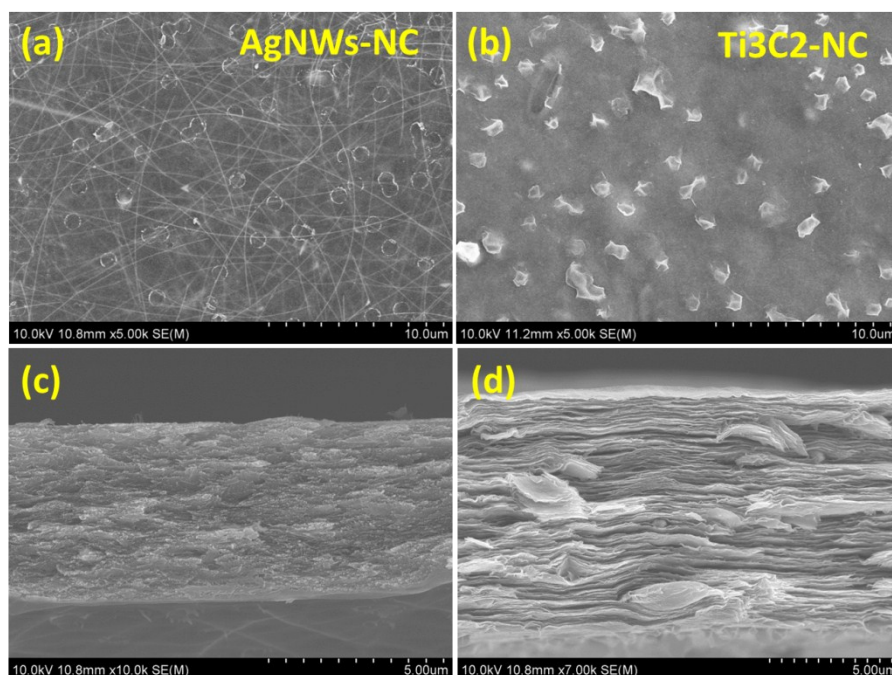


Fig. S2 Surface and cross-sectional SEM images of AgNWs-NC (a,c) and Ti_3C_2 -NC (b,d) hybrid films, respectively.

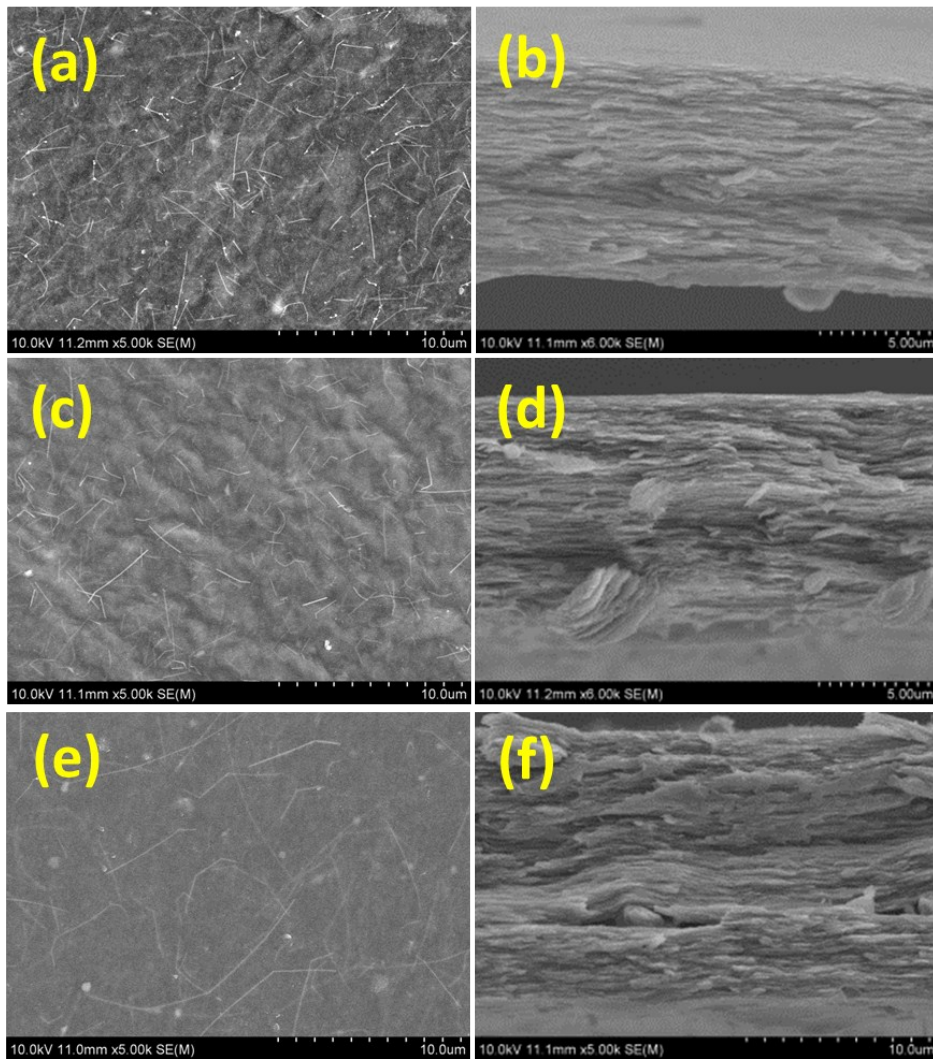


Fig. S3 SEM images of top surfaces and fracture surfaces for (a, b) TN0.125A, (c, d) TN0.25A and (e, f) TN0.5A.

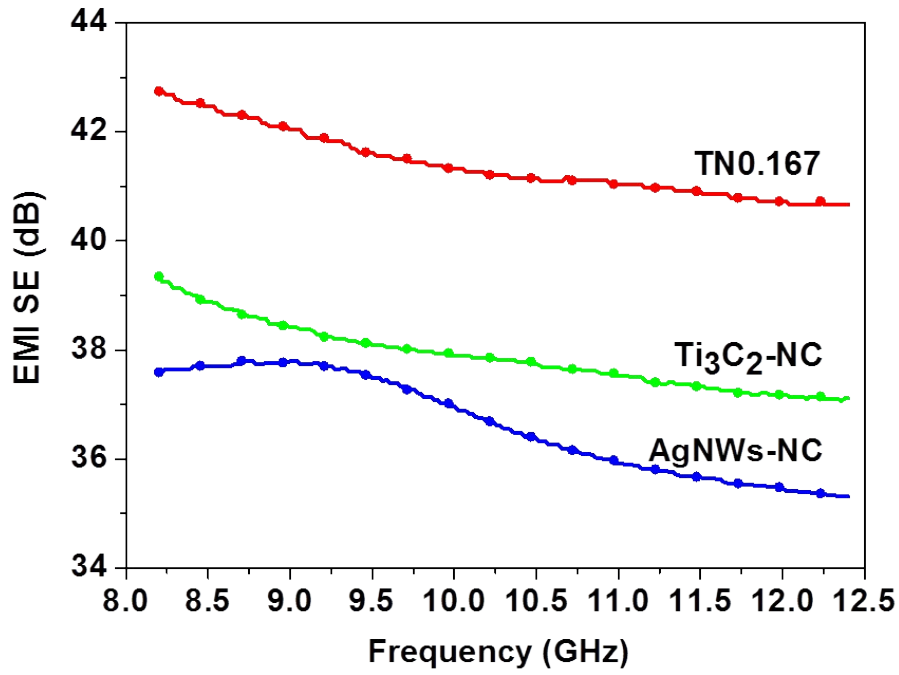


Fig. S4 EMI SE of TN0.167A, Ti₃C₂-NC and AgNWs-NC hybrid films in the frequency range of 8.2-12.4 GHz.

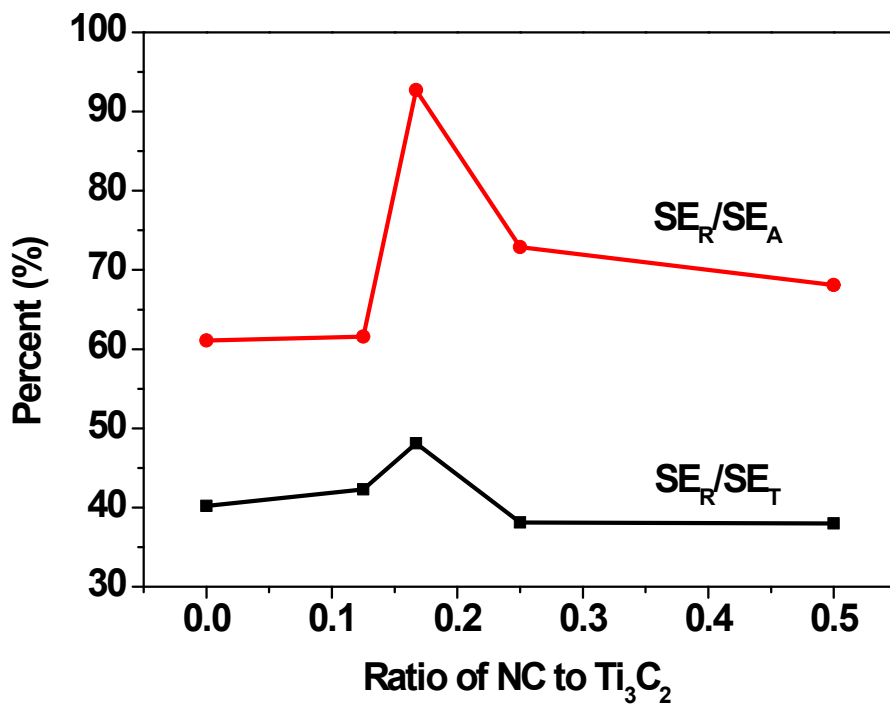


Fig. S5 SE_R/SE_A and SE_R/SE_T values of pure Ti₃C₂ and hybrid films as the ratio of NC-to-Ti₃C₂.

Table S1 Comparison of EMI shielding performance for various materials

| Sample | Materials | Content (wt%) | Matrix | Thickness (cm) | Density ($\text{g}\cdot\text{cm}^{-3}$) | EMI SE (dB) | SSE ($\text{cm}^2\cdot\text{g}^{-1}$) | SSE/t ($\text{cm}^2\cdot\text{g}^{-1}$) | Ref. |
|--------|---|---------------|----------------------|----------------|---|--------------|---|---|------------------|
| 1 | Ni fiber/PES | 7* | PES | 0.285 | 1.87 | 58 | 31 | 108.7 | ¹ |
| 2 | Ni filaments/PES | 7* | PES | 0.285 | 1.85 | 87 | 47 | 164.9 | ¹ |
| 3 | copper | Bulk | / | 0.31 | 9 | 90 | 10 | 32.3 | ¹ |
| 4 | CuNi-CNT foam | Bulk | / | 0.15 | 0.23 | 54.6 | 237 | 1580 | ² |
| 5 | SWCNT/PS | 7 | PS | 0.12 | 0.56 | 18.5 | 33 | 275 | ³ |
| 6 | MWCNT/WPU | 76.2 | WPU | 0.1 | 0.039 | 21.1 | 541 | 5410 | ⁴ |
| 7 | CNT sponge | Bulk | / | 0.238 | 0.02 | 22 | 1100 | 4622 | ⁵ |
| 8 | CNT/Epoxy | 0.66 | Epoxy | 0.2 | 0.975 | 33 | 33.84 | 169.2 | ⁶ |
| 9 | CNT/Cellulose | 40 | cellulose | 0.015 | 1.7 | 35 | 20.586 | 1372.4 | ⁷ |
| 10 | RGO foam | Bulk | / | 0.03 | 0.06 | 25.2 | 420 | 14000 | ⁸ |
| 11 | Graphene paper | Bulk | / | 0.005 | 0.81 | 62 | 76.5 | 15309 | ⁹ |
| 12 | Fe ₃ O ₄ /Graphene paper | Bulk | / | 0.03 | 0.78 | 24 | 30.76 | 1025 | ¹⁰ |
| 13 | Graphene/PDMS foam | 0.8 | PDMS | 0.1 | 0.06 | 19.98 | 333 | 3330 | ¹¹ |
| 14 | Graphene foam/PEDOT:PSS | 40 | PEDOT:PSS | 0.15 | 0.0198 | 69.1 | 3124 | 20827 | ¹² |
| 15 | CNT/graphene foam | Bulk | / | 0.16 | 0.0058 | 38.4 | 6620 | 41375 | ¹³ |
| 16 | Ti ₃ C ₂ foam | Bulk | / | 0.006 | 0.22 | 70 | 318 | 53030 | ¹⁴ |
| 17 | Ti ₃ C ₂ /SA | 90 | SA | 0.0008 | 2.317 | 57 | 24.6 | 30830 | ¹⁵ |
| 18 | Ti ₃ C ₂ | Bulk | / | 0.0011 | 2.394 | 68 | 28.4 | 25863 | ¹⁵ |
| 19 | Ti ₃ C ₂ /CNF | 90 | cellulose | 0.0047 | 2 | 24 | 12 | 2647 | ¹⁶ |
| 20 | Ti ₃ C ₂ T _x /TOCNF | 50 | cellulose | 0.0047 | 1.46 | 32.7 | 22.4 | 4761 | ¹⁷ |
| 21 | CNF@MXene | 50 | cellulose | 0.0035 | / | 40 | / | 7029 | ¹⁸ |
| 22 | d-Ti ₃ C ₂ T _x /ANF | 60 | Aramid Nanofibe | 0.0017 | 1.255 | 28.54 | 22.74 | 13377 | ¹⁹ |
| 23 | MXene-GO | 50 | GO | 0.0007 | / | 50.17 | / | / | ²⁰ |
| 24 | Ti ₃ C ₂ T _x / PEDOT:PSS | 87.5 | PEDOT:PSS | 0.0011 | 1.94 | 42.1 | 21.7 | 19497.8 | ²¹ |
| 25 | MXene film | Bulk | / | 0.0009 | 2.165 | 42.78 | 19.76 | 21953 | This work |
| 26 | MXene/AgNW film | 86 | Nanocellulose | 0.0017 | 1.5 | 42.74 | 28.49 | 16724 | |

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