Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Study on contact angles and surface energy of MXene films

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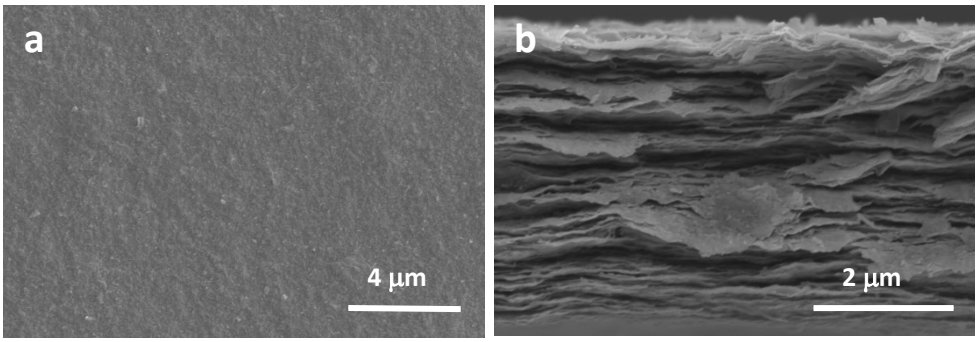
a
4 μm
b
2 μm

Fig. S1 SEM images of fresh MXene film, (a) front surface and (b) cross-section. The loading of fresh MXene film is 1.0 mg/cm^2.

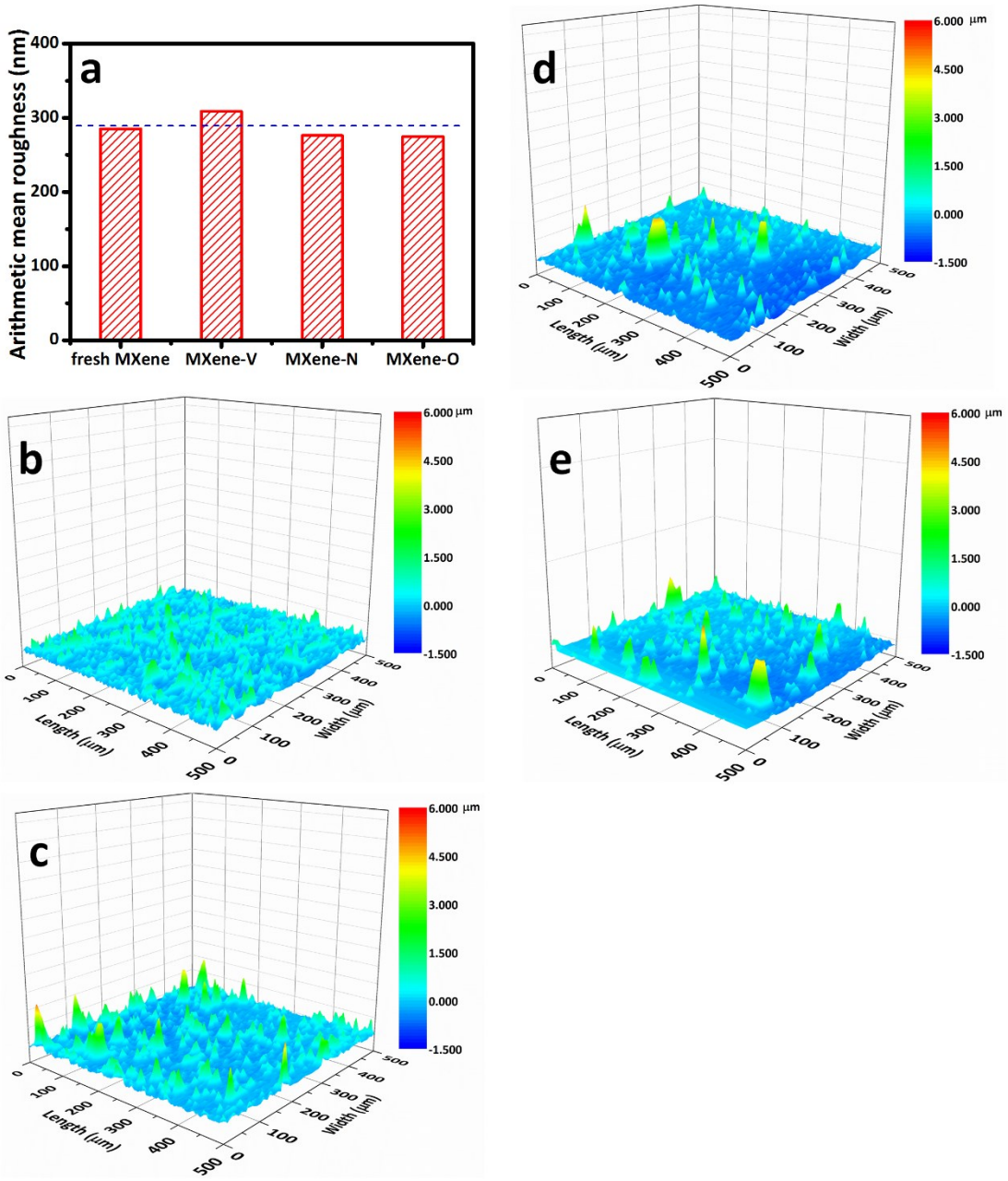

Fig. S2 (a) Arithmetic mean roughness of fresh MXene film and MXene films after storing for 168 h. The 3D surface of (b) fresh MXene, (c) MXene-V，(d) MXene-N and (e) MXene-O. The loading of fresh MXene films, MXene-N, MXene-O, and MXene-V films is 1.0 mg/cm^2.

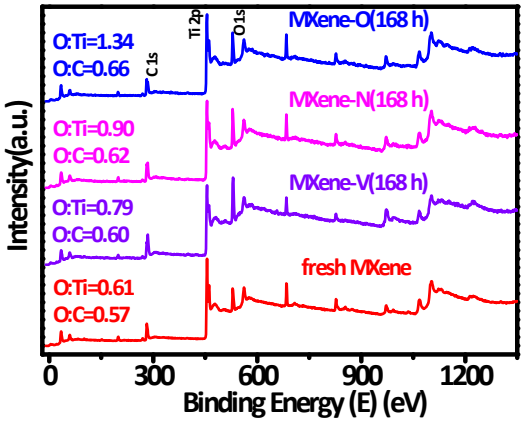

Fig. S3 Broad scan XPS spectra of fresh MXene film and MXene films after storing for for 168 h. The loading of fresh MXene films, MXene-N, MXene-O, and MXene-V films is 1.0 mg/cm^2.

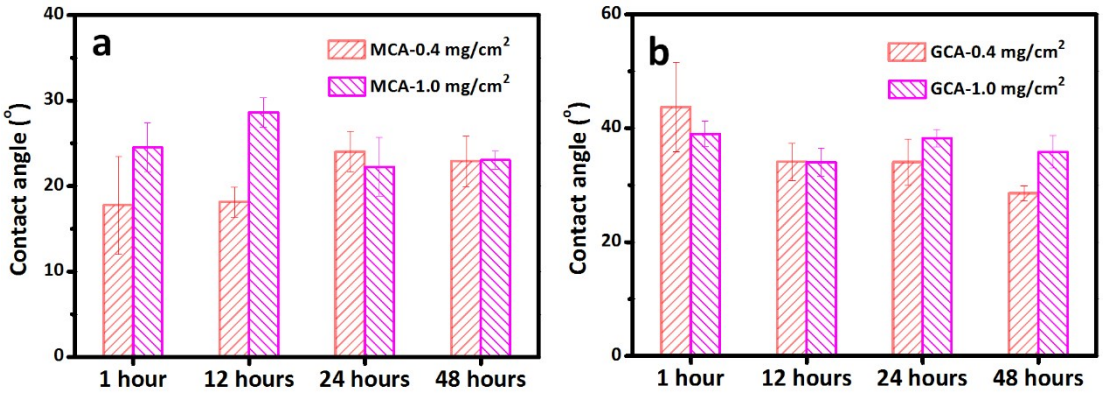

Fig. S4 Time-dependent MCAs (a) and GCAs (b) of MXene films with mass loadings of 0.4 mg/cm^2 and 1.0 mg/cm^2.

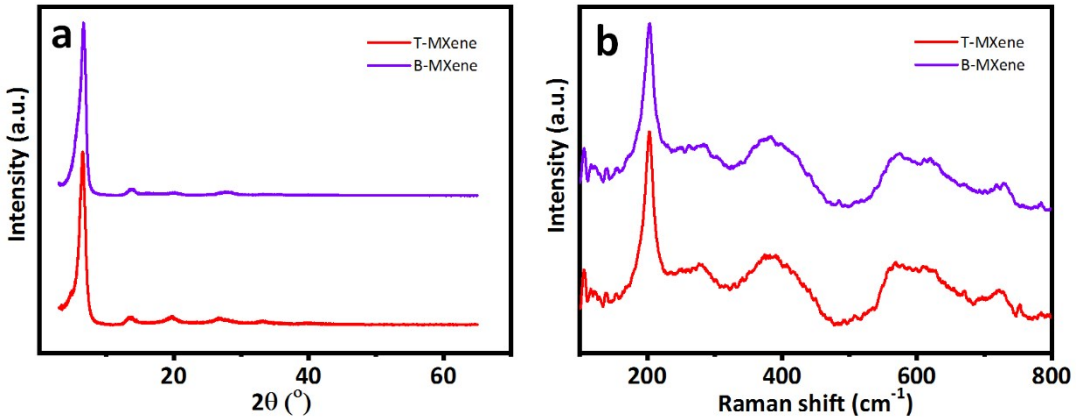

Fig. S5 (a) XRD, (b) Raman spectra of T-$Ti_3C_2T_x$ and B-$Ti_3C_2T_x$ films.

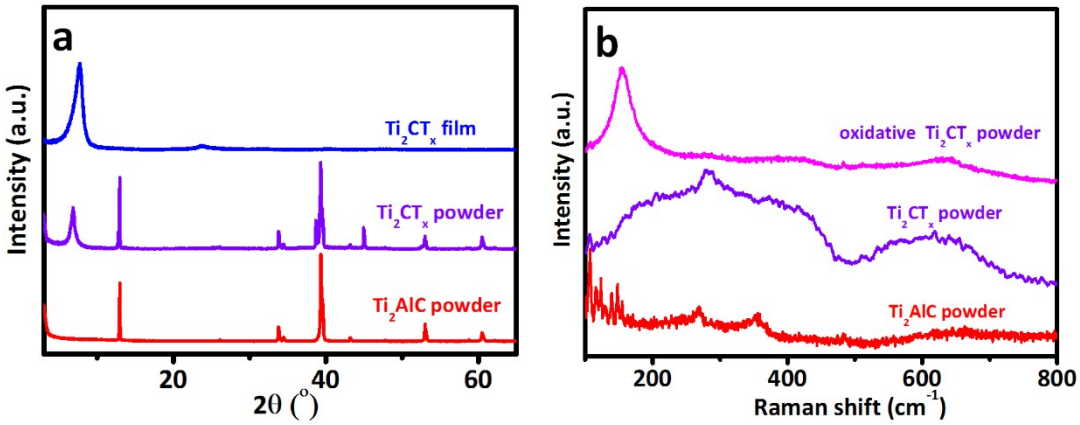

Fig. S6 (a) XRD and (b) Raman of Ti_2AlC and Ti_2CT_x MXene.

Fig. S7 The photo of damaged Ti_2CT_x MXene by oxidation.

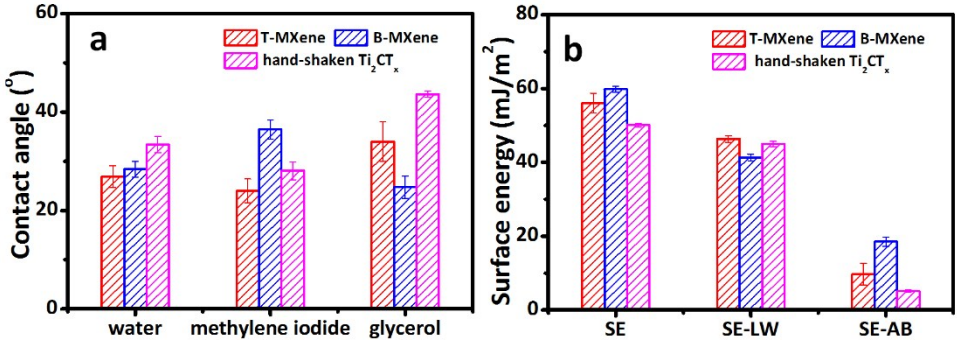

Fig. S8 (a) CAs and (b) SE of MXene films assembled of $Ti_3C_2T_x$ nanoflakes delaminated via tip sonication (T-$Ti_3C_2T_x$) and bath sonication (B-$Ti_3C_2T_x$), and Ti_2CT_x nanoflakes delaminated via hand-shaking. All the films have a mass loading of 0.4 mg/cm^2.