Electronic Supplementary Material (ESI) for Dalton Transactions.
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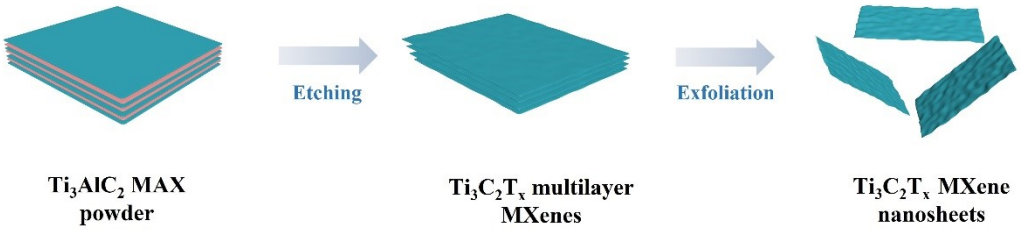

Ti_3AlC_2 MAX powder

$Ti_3C_2T_x$ multilayer MXenes

$Ti_3C_2T_x$ MXene nanosheets

Fig. S1 The schematical illustration of the preparation of MXene nanosheets.

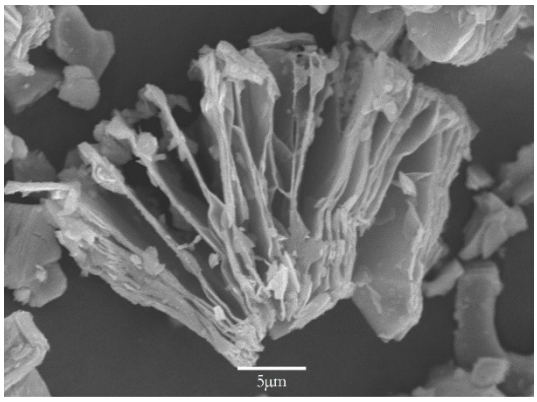

Fig. S2 The SEM image of multilayer MXenes powder.

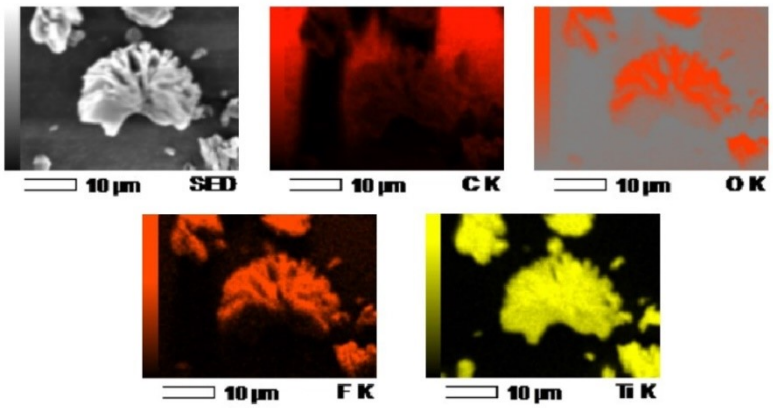

Fig. S3 The images of EDS elemental mapping analysis.

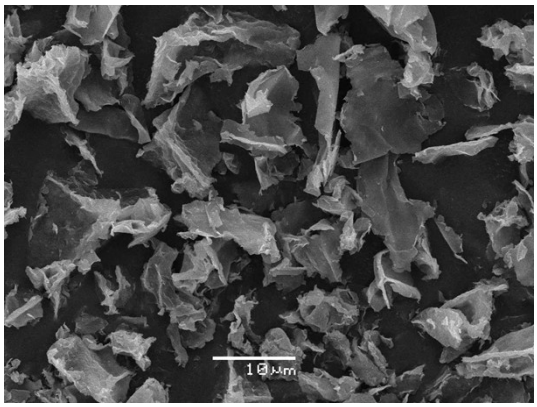

Fig. S4 The SEM image of exfoliated MXene nanosheets.

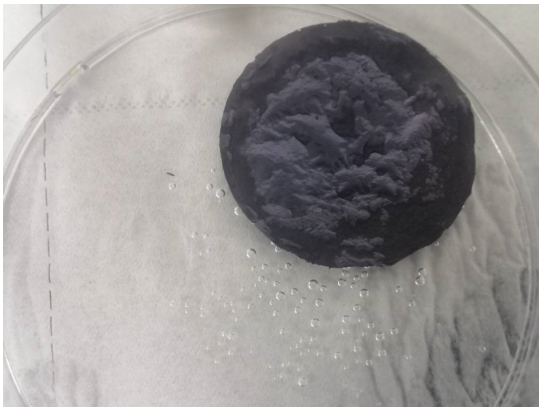

Fig. S5 The optical photograph showing obvious bubbles during etching of SiO_2 spheres.

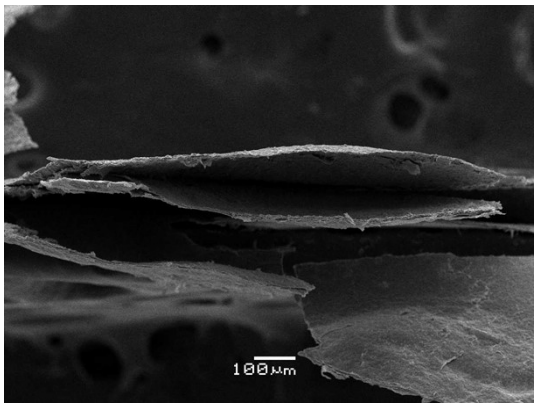

Fig. S6 The SEM image of the cross section of the foamed film showing apparent layer separation.

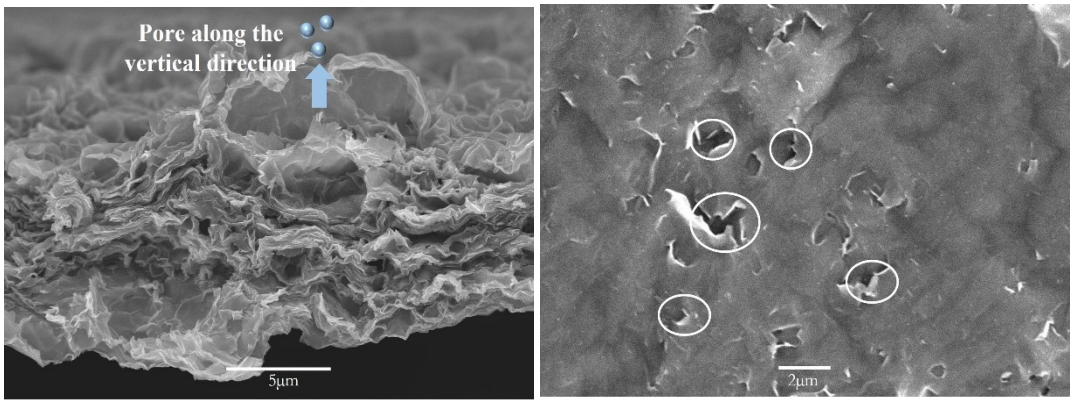

Fig. S7 The SEM images showing pores along the vertical direction of the film which shall come from the cracking of horizontally stacked nanosheets at interval sites under drastic pressure.

a) b)

Fig. S8 The optical images showing the thicknesses of the pristine MXenes film (a) and the PK-MXenes film (b).

The densities of the pristine MXenes and PK-MXenes films were calculated after measuring their thicknesses and weights. The thicknesses of the two films were firstly detected from their corresponding cross-section SEM images. However, for the PK-MXenes film, it's hard to determine its thickness since part of the layers hunch up, just like what has been observed in the right image of Fig. S7. Hence, the thicknesses of the two films were detected by a thickness gauge. Of course, the accuracy of them were not enough due to that the limit of detection of the thickness gauge is only 1 μm. As seen from above two images, the thickness of the PK-MXenes film is larger than that of the pristine MXenes film, justifying the foaming effect.

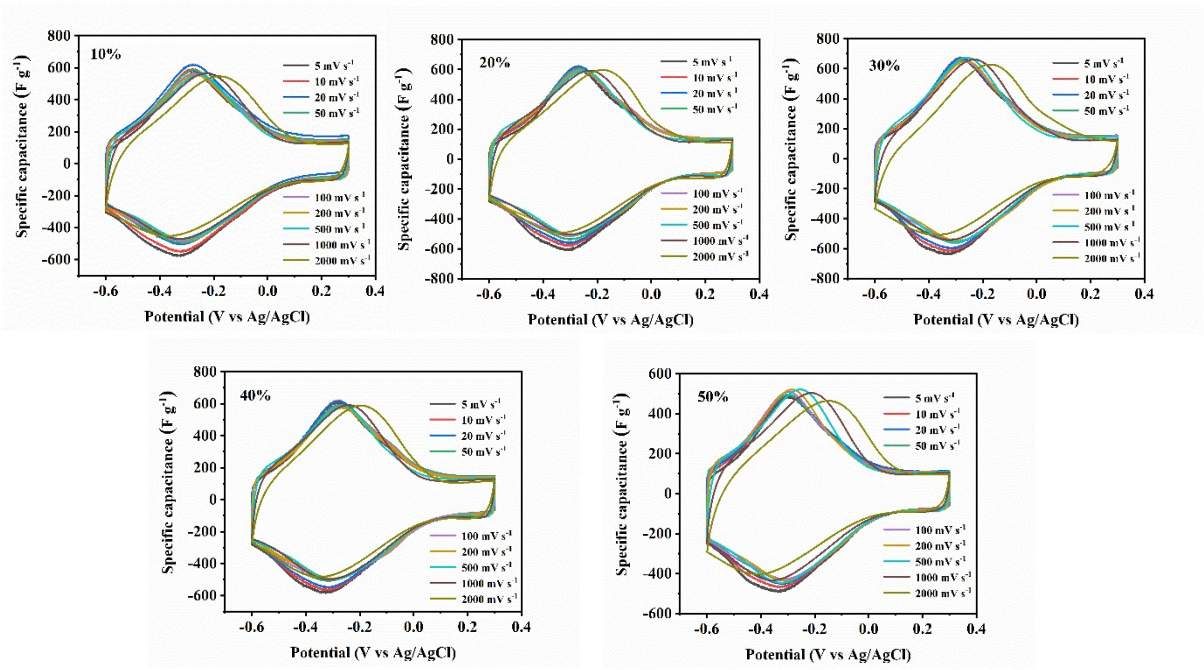

Fig. S9 The CV curves of the obtained P-MXenes electrodes at different scan rates, with the increase of mass ratio of SiO_2 from 10 to 50 %.

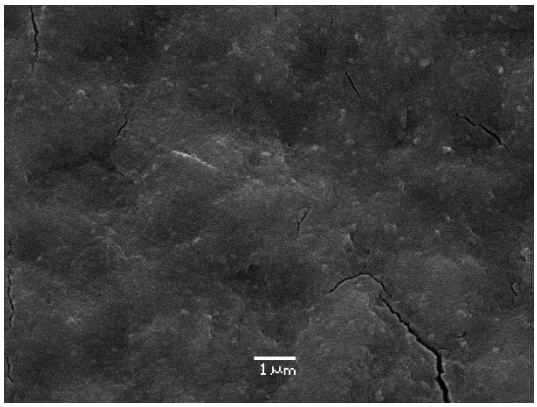

Fig. S10 The SEM image showing the cracking of the P-MXenes film with excess SiO_2.

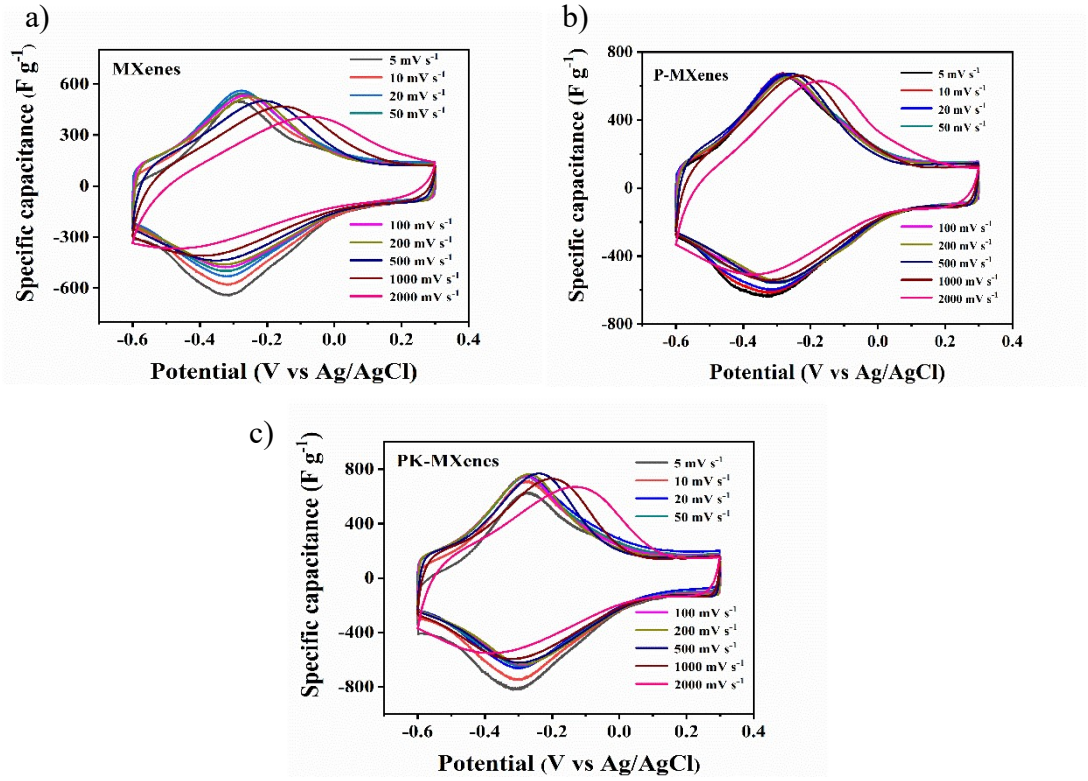

Fig. S11 The CV curves of a) MXenes, b) P-MXenes and c) PK-MXenes film electrodes at different scan rates. It should be noted that, the CV curves of P-MXenes listed here are same with those in Fig. S8, with the mass ratio of SiO_2 accounting for 30 %.

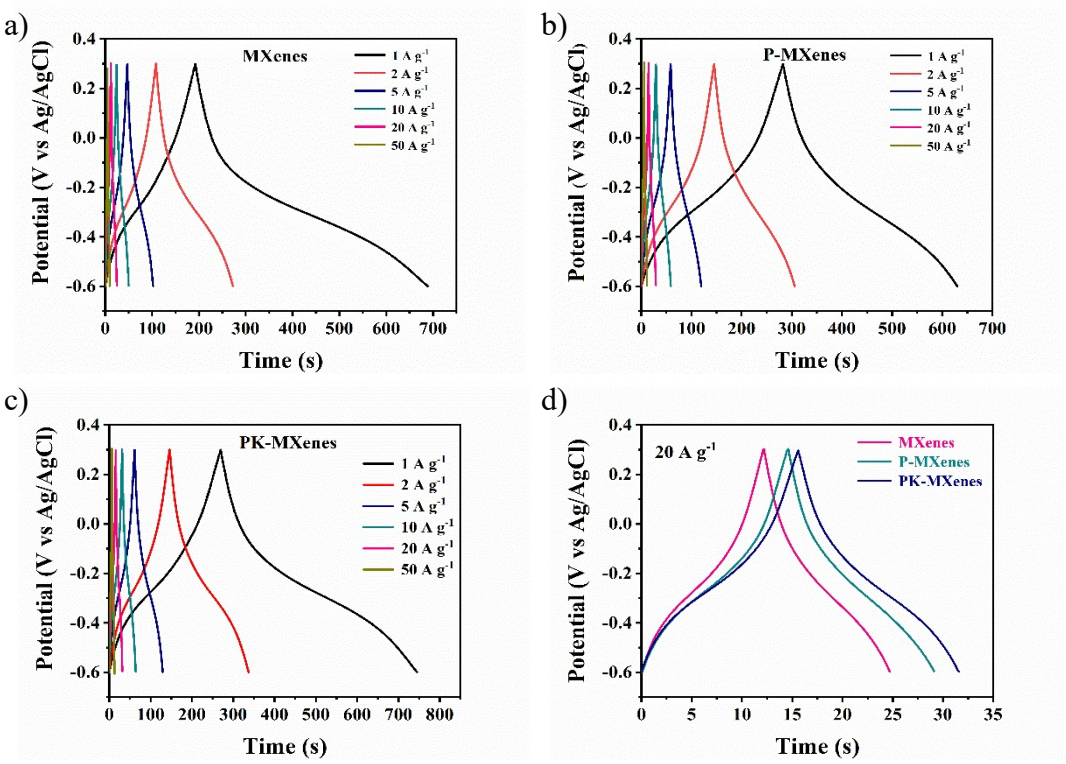

Fig. S12 The GCD curves of a) MXenes, b) P-MXenes and c) PK-MXenes film electrodes at different current densities; d) Their comparison curves at the current density of 20 A g^{-1}.

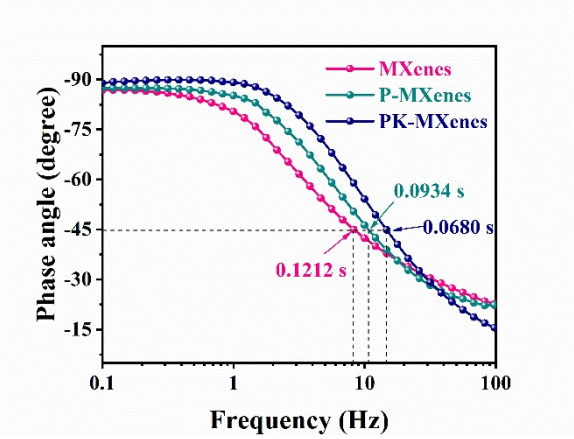

Fig. S13 The Bode plots of the MXenes, P-MXenes and PK-MXenes electrodes.

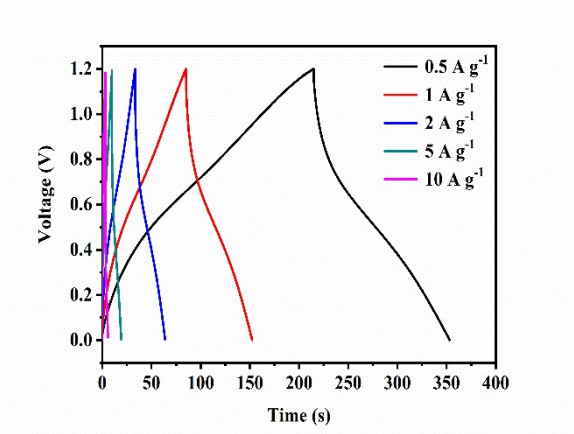

Fig. S14 The GCD curves of the assembled symmetric SC device at different current densities.