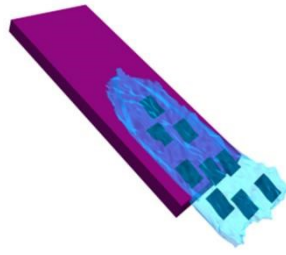
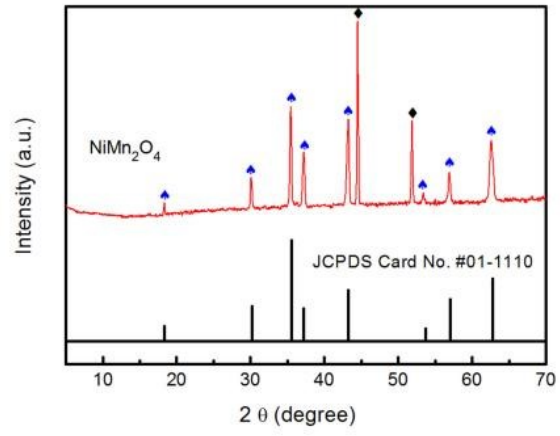


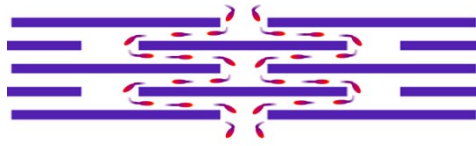
**Fig. S1** Low and high magnification SEM images of the F-NMO@MX composites.



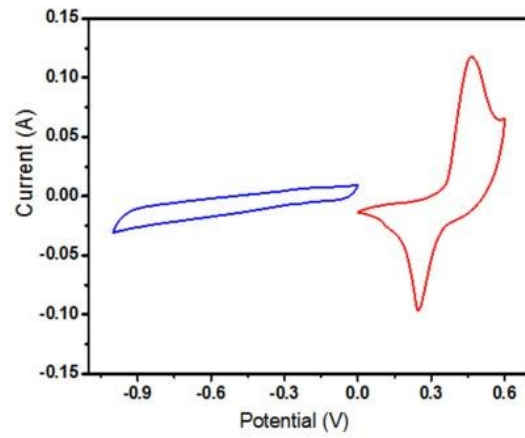
**Fig. 2** Schematic illustration of the capillarity diffusion direction of MXene aqueous solution.



**Fig. S3** XRD patterns of the NiMn<sub>2</sub>O<sub>4</sub> nanosheets.



**Fig. 4** Schematic illustration of the diffusion direction of electrolyte ion in the F-NMO@MX composites.



**Fig. S5** CV curves of the AC and C-NMO@MX electrode, which were recorded at 4 mV s<sup>-1</sup>.