

Electronic Supplementary Information

High sensitivity, fast response and high stability humidity sensor of curly flake $\text{Ti}_3\text{C}_2\text{T}_x$ MXene prepared by electrolytic intercalation of NaOH solution

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This file contains:

Supplementary Figures S1 to S7

Supplementary Table S1

Supplementary Captions for Movies S1 to S2

Other supplementary materials for this manuscript include the following:

Supplementary Movies S1 to S2

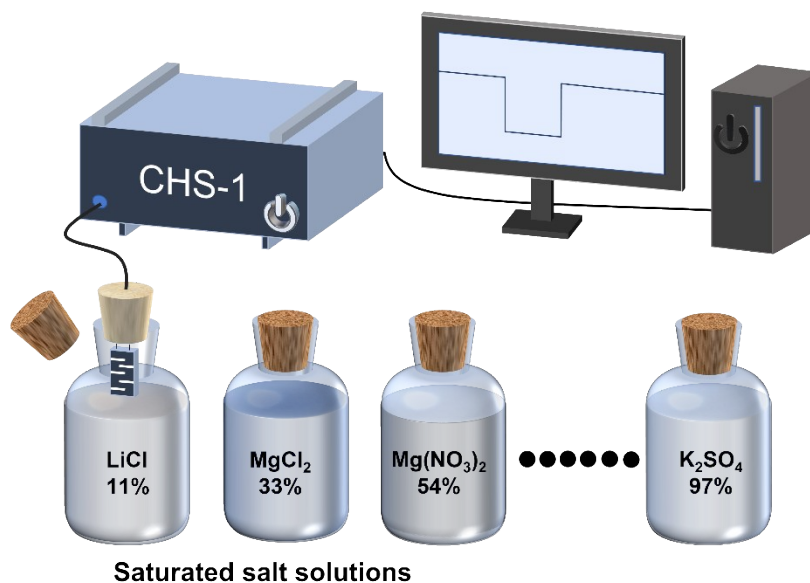


Figure S1. Schematic diagram of the experimental setup.

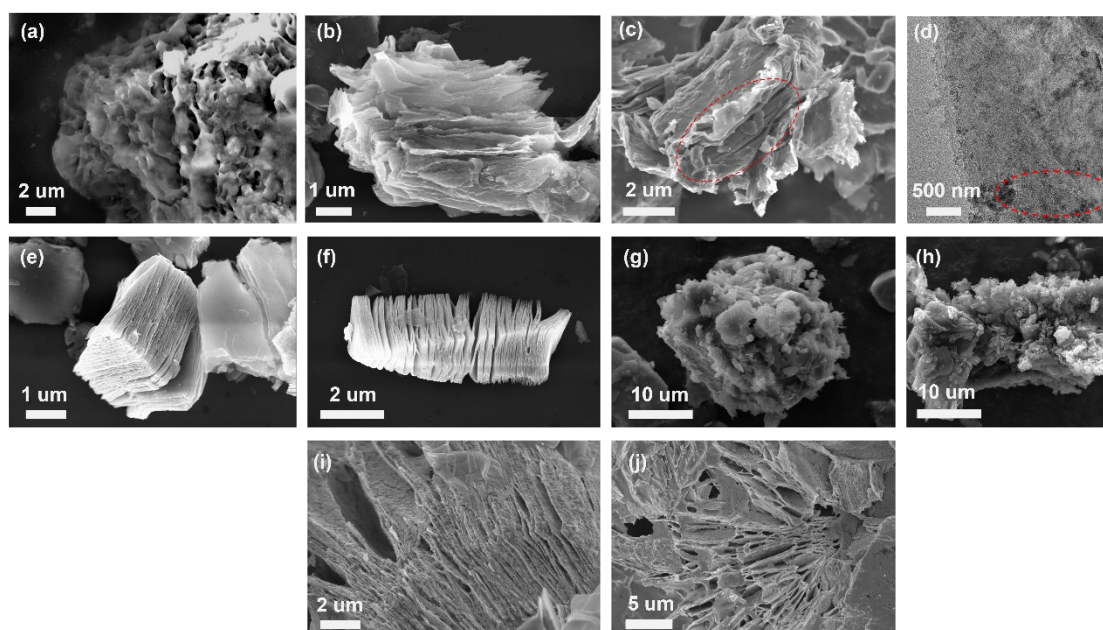


Figure S2. (a) SEM images of CF-Ti₃C₂T_x MXene; (b, c) SEM images of A1 and A3 samples; (d) TEM images of A3 samples; (e, f) SEM images of B1 samples; (g, h) SEM images of B2 samples; (i, j) SEM images of B3 samples.

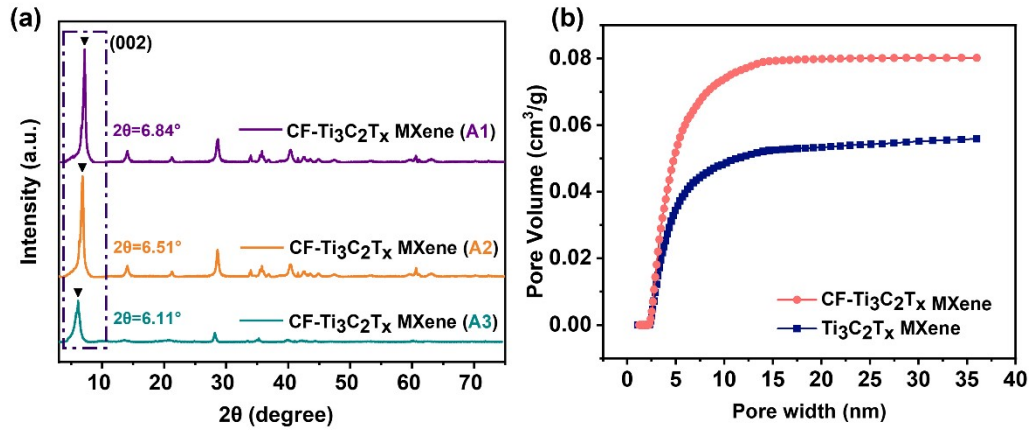


Figure S3. (a) XRD patterns of A1、A2 and A3 samples; (b) Pore size distribution curves of Ti₃C₂T_x MXene and CF-Ti₃C₂T_x MXene.

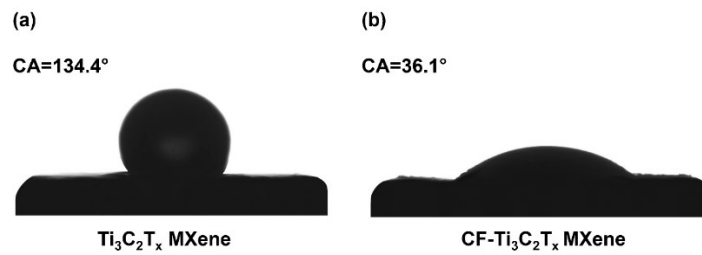


Figure S4. Hydrophilic angle test of (a) Ti₃C₂T_x MXene and (b) CF-Ti₃C₂T_x MXene.

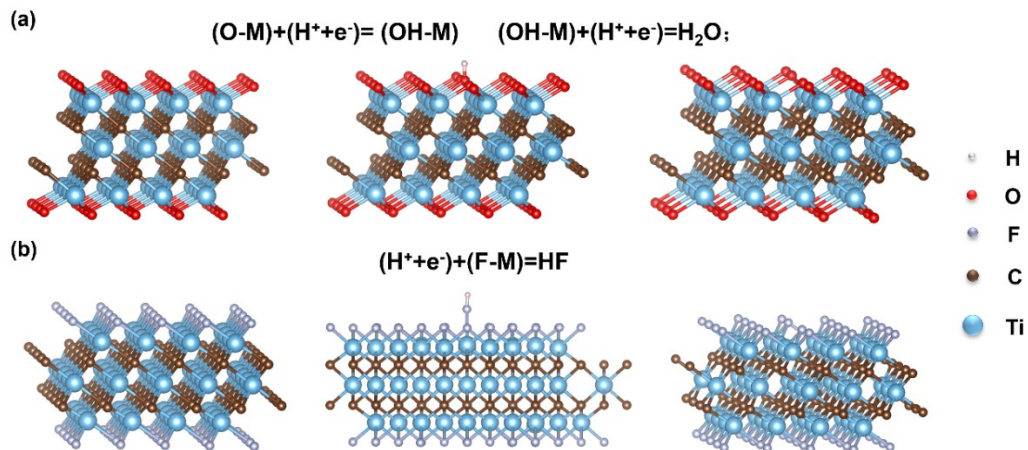


Figure S5. (a) Schematic diagram of the hydro-deoxygenation model; (b) Schematic diagram of the hydro-defluorination model.

Table S1. Bader charges of the two adsorption processes.

Bader charge			
	Gain or Loss of Electrons		Gain or Loss of Electrons
H	-0.2589	OH	0.6302
O termination	0.8891		
H	-0.429	HF	0.3362
F termination	0.7652		

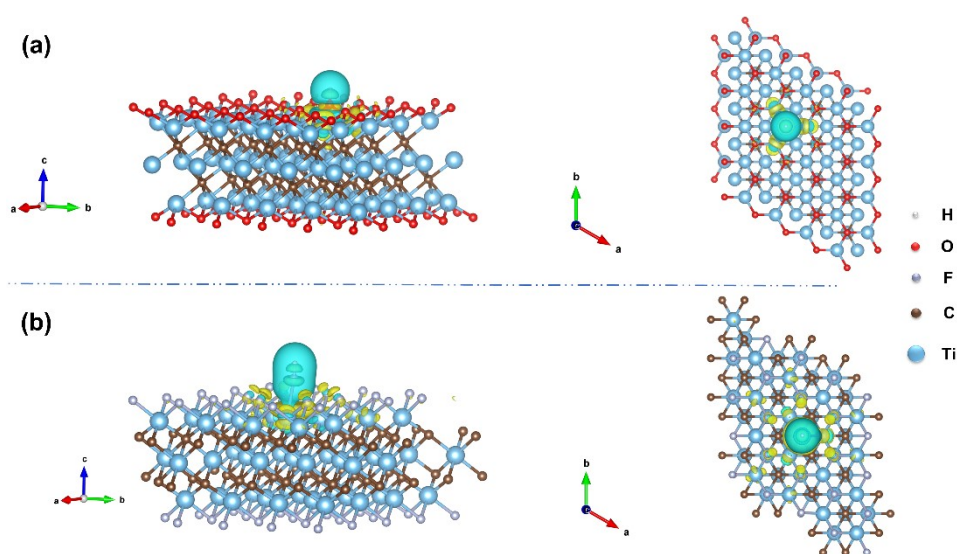


Figure S6. (a) Differential charge density diagram of the ($H^+ + e^-$) adsorption processes on (a) O termination; (b) F termination.

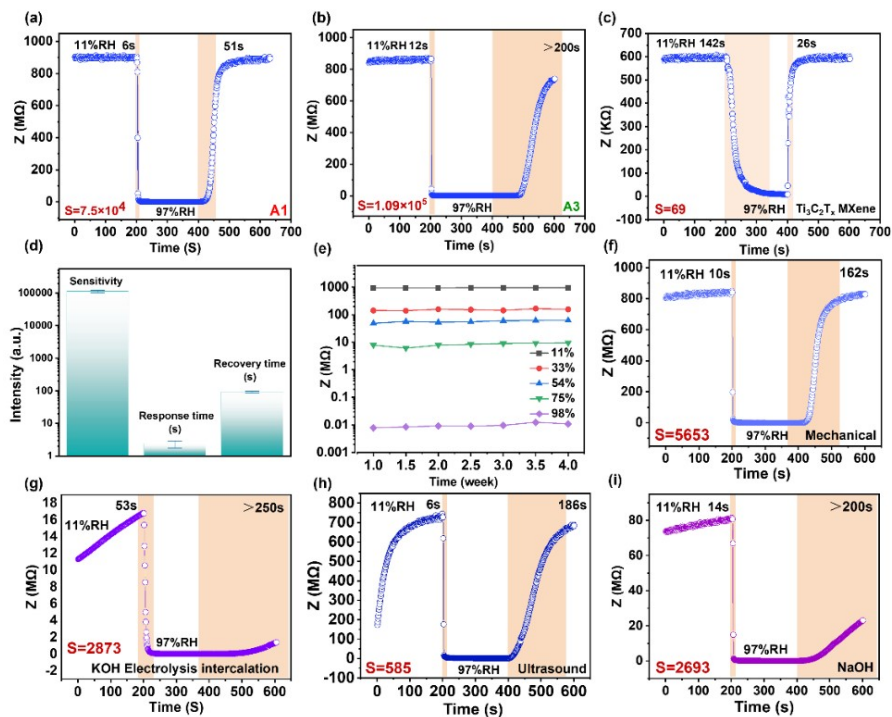


Figure S7. (a-c) Humidity response recovery curves of A1, A3 and $\text{Ti}_3\text{C}_2\text{T}_x$ MXene at 11%RH-97%RH; (d) Batch stability of CF- $\text{Ti}_3\text{C}_2\text{T}_x$ MXene humidity sensor; (e) Storage stability test in the atmosphere. (f-i) Humidity response recovery curves of B1, B2, B3 and B4 for 11%RH-97%RH.

Movie captions:

Movie S1. The working process of non-contact switch. (MP4)

Movie S2. The working process of breathing indicator light. (MP4)