

**Bio-inspired MXene/quaternary chitosan membrane with“brick-and-mortar”
structure towards high-performance photothermal conversion**

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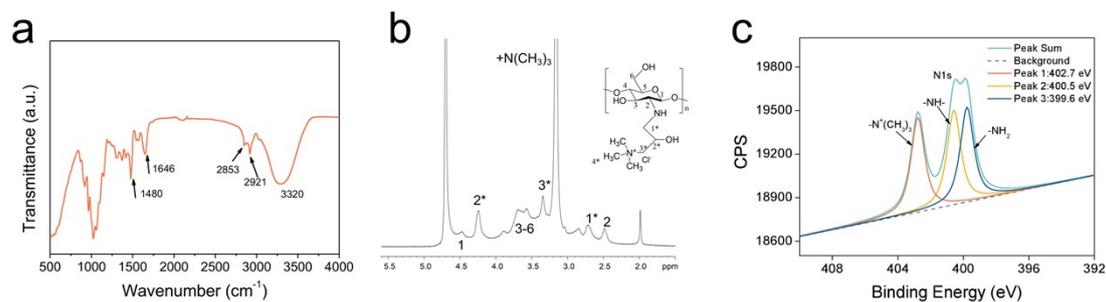


Figure S1. Characterization of the chemical structure of QCS. a. FT-IR spectra of QCS membrane. b. ¹H NMR spectrum of QCS dissolved in D₂O. c. XPS N1s spectra of QCS.

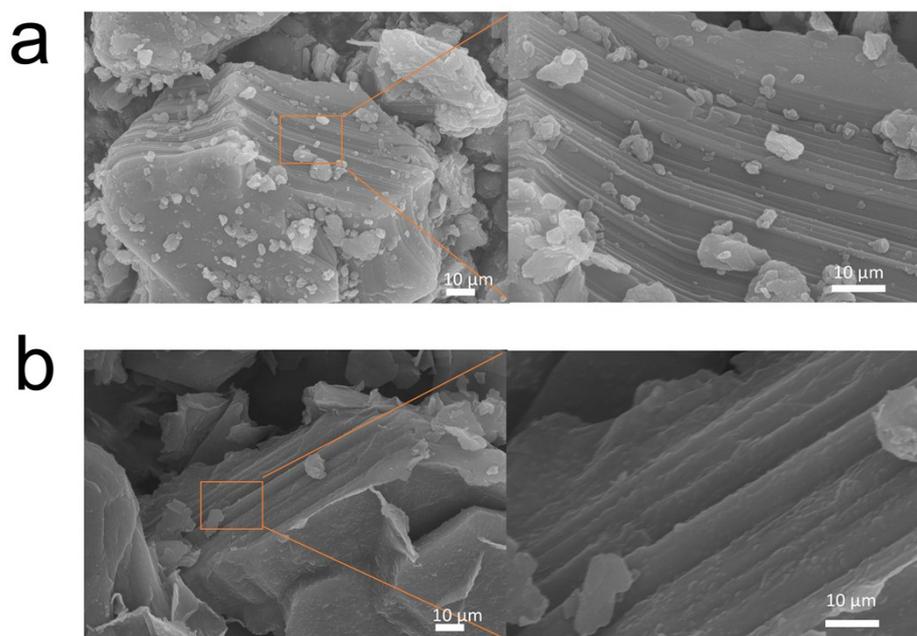


Figure S2. SEM images of Ti₃AlC₂ and MXene powders studied here. (a) SEM micrographs of Ti₃AlC₂. (b) SEM micrographs of MXene.

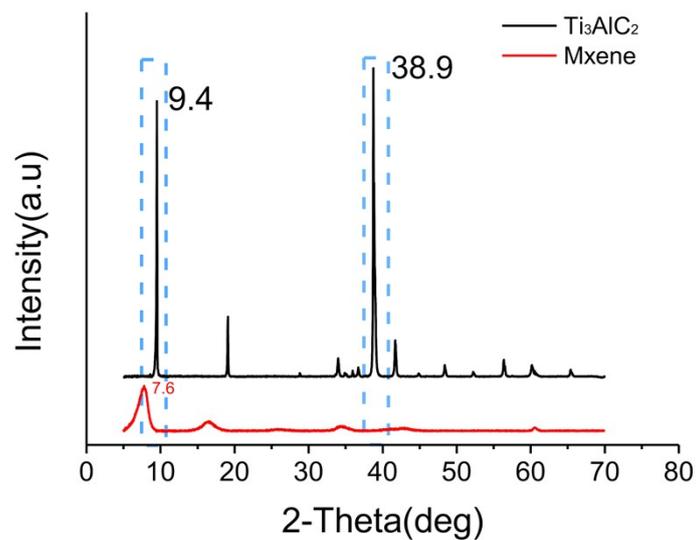


Figure S3. X-ray diffraction of Ti_3AlC_2 and freeze-dried MXene power.

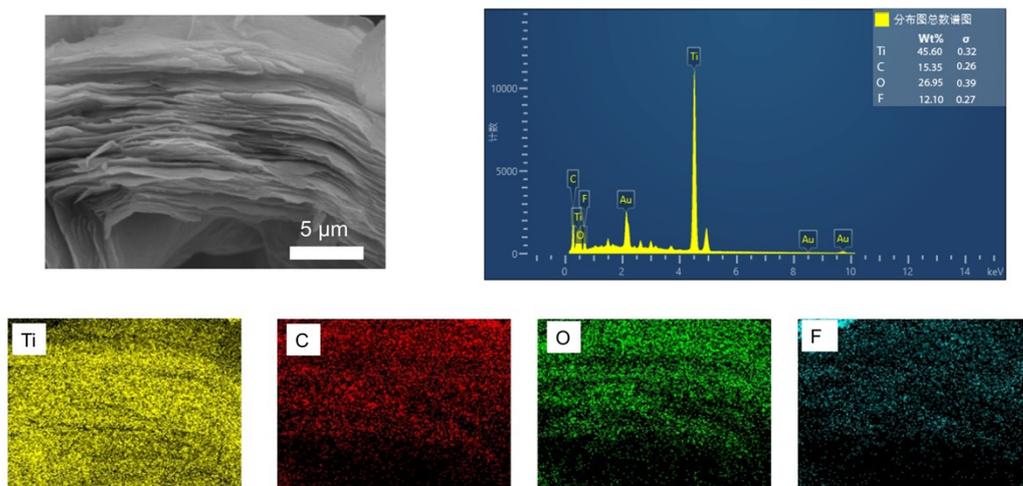


Figure S4. The elemental maps of MXene and the relative content of main elements (Ti, C, O, F).

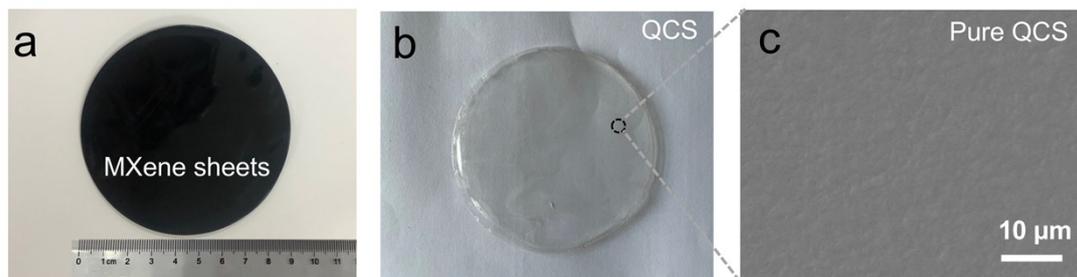


Figure S5. A sample diagram of (a) the MXene/QCS membrane and (b) the pure QCS membrane, and a SEM image of (c) the cross section of the QCS membrane.



Figure S6. Photographs of a MXene/QCS membrane before a) and after stretching b) under the action of tension machine.

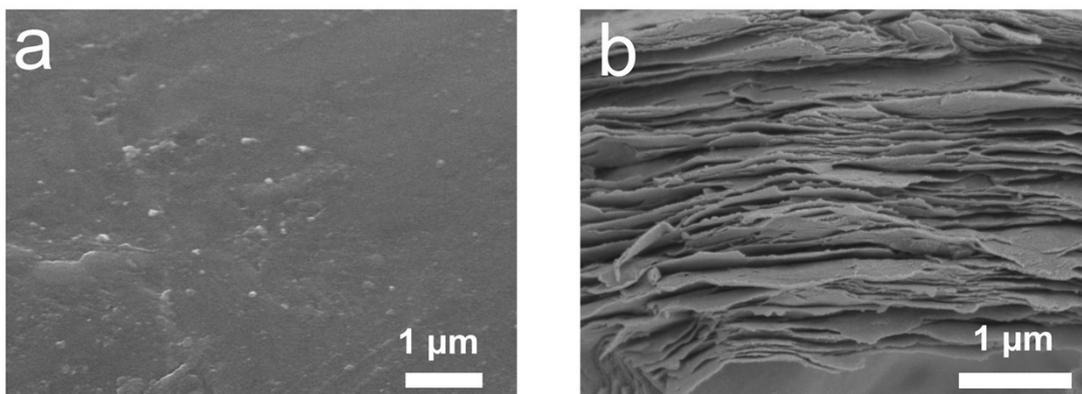


Figure S7. SEM micrograph of the fracture surface of a) pure QCS membrane and b) pure MXene.

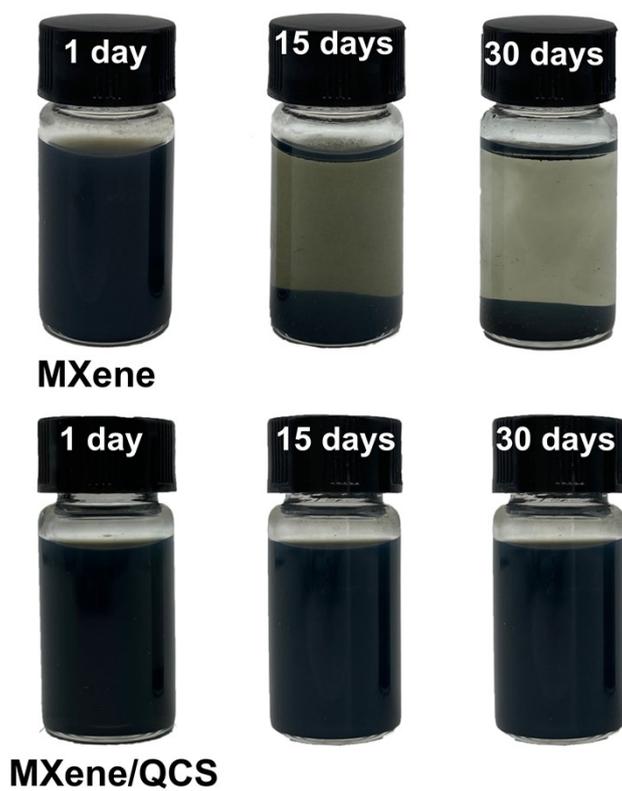


Figure S8. Photographs of MXene and MXene/QCS mixture suspension standing still for 30 days.