

Supporting Information for

Wettability Gradient Induced Diode: MXene-Engineered Membrane for Passive-Evaporative Cooling

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Supplementary Figures

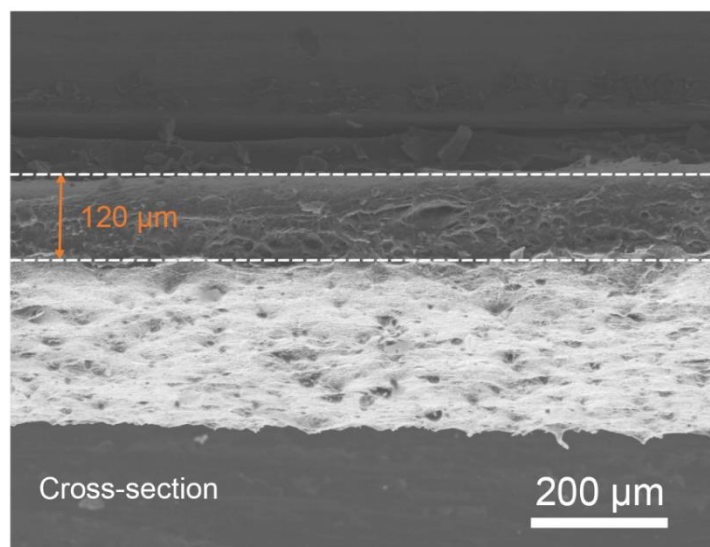


Fig. S1 Cross-section SEM image of WGID membrane

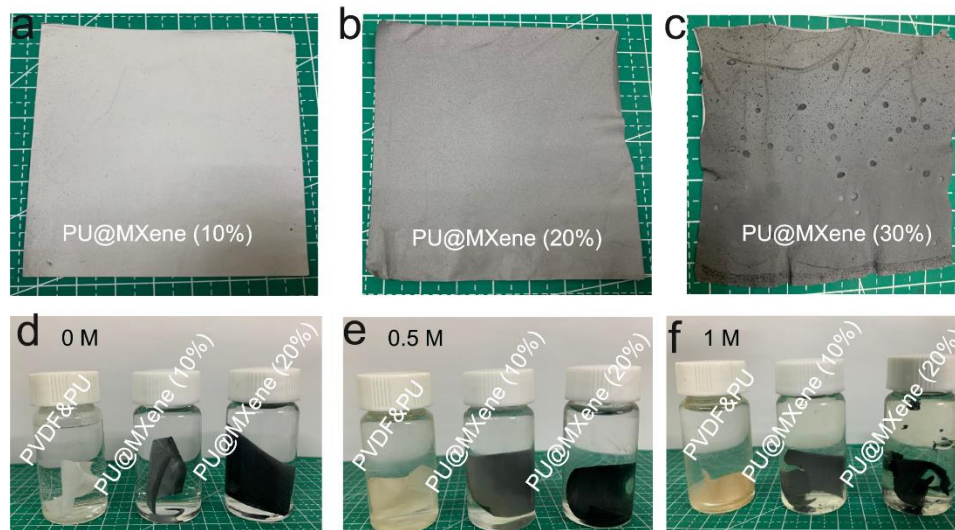


Fig. S2 Photographs of **a** PU@MXene(10%) membrane, **b** PU@MXene(20%) membrane, and **c** PU@MXene(30%) membrane. Photographs of samples for alkali treatment with **d** 0 M, **e** 0.5 M, and **f** 1 M NaOH solution

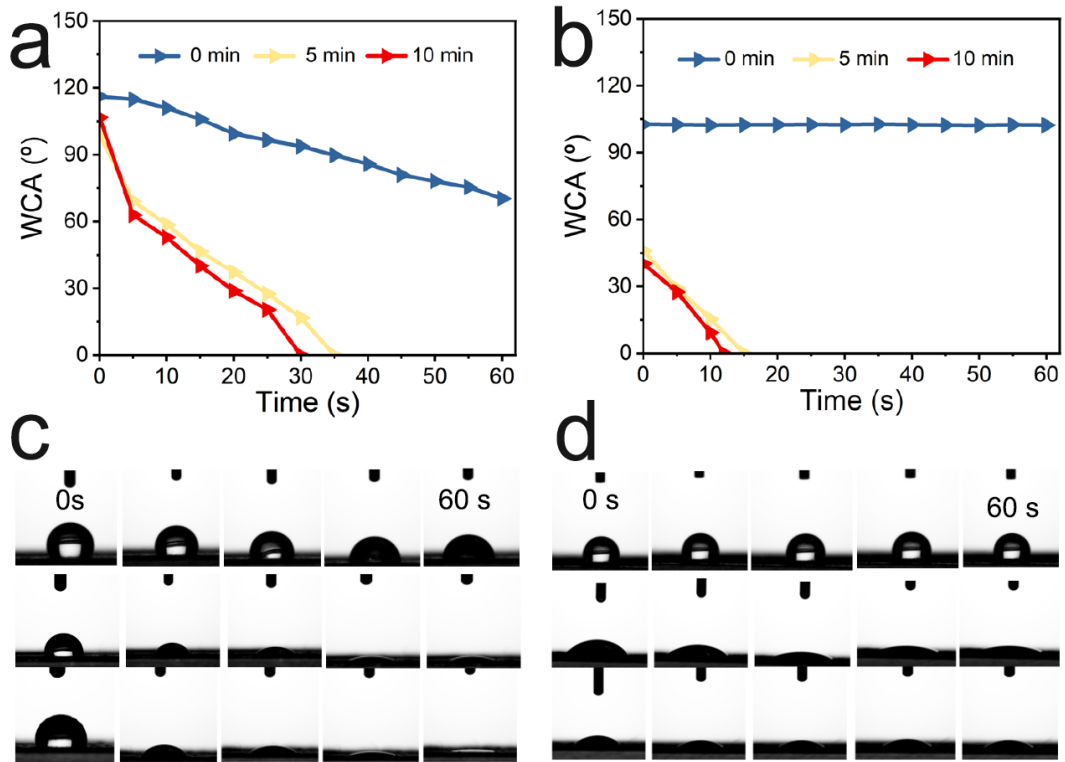


Fig. S3 Curves of apparent water contact angle change **a** PU@MXene(10%) and **b** PU@MXene(20%). Optical photos **c** PU@MXene(10%) and **d** PU@MXene(20%) in 0.5 M NaOH solution from top to bottom 0 min, 5 mins, and 10 mins

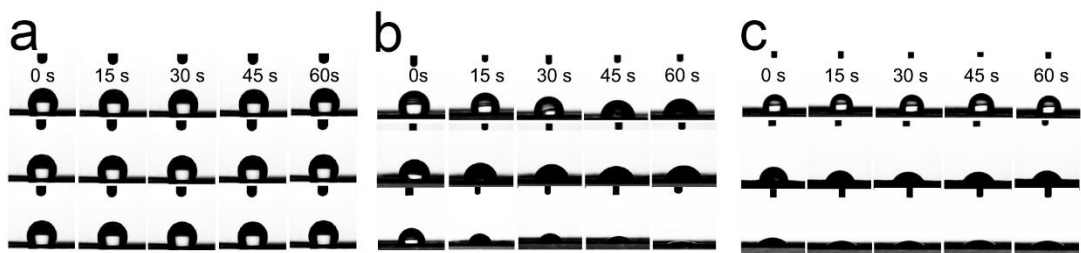


Fig. S4 Optical photos **a** PVDF&PU, **b** PU@MXene(10%), and **c** PU@MXene(20%) with different concentration from top to bottom 0 M, 0.25 M, and 0.5M for 5 mins of alkali treatment

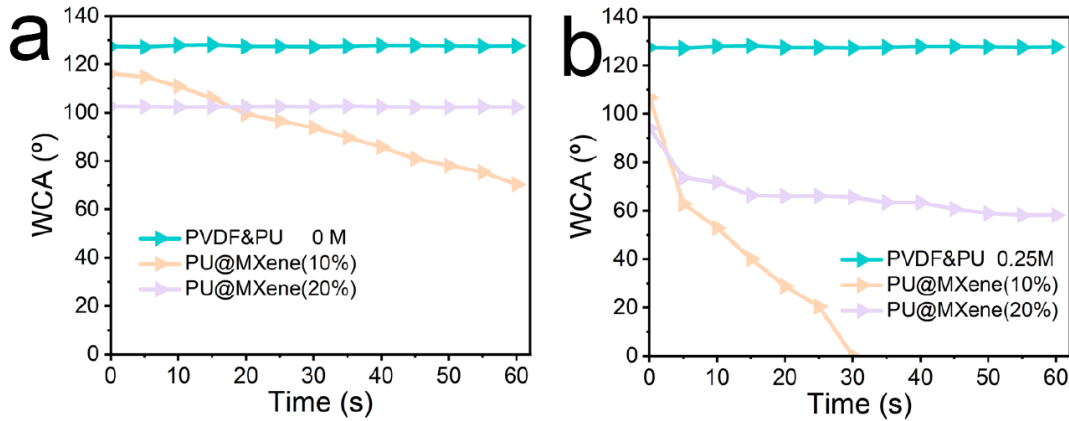


Fig. S5 Curves of apparent water contact angle change of PVDF&PU, PU@MXene(10%) and PU@MXene(20%) for different concentration of alkali treatment. **a** 0.25 M and **b** 0.5 M

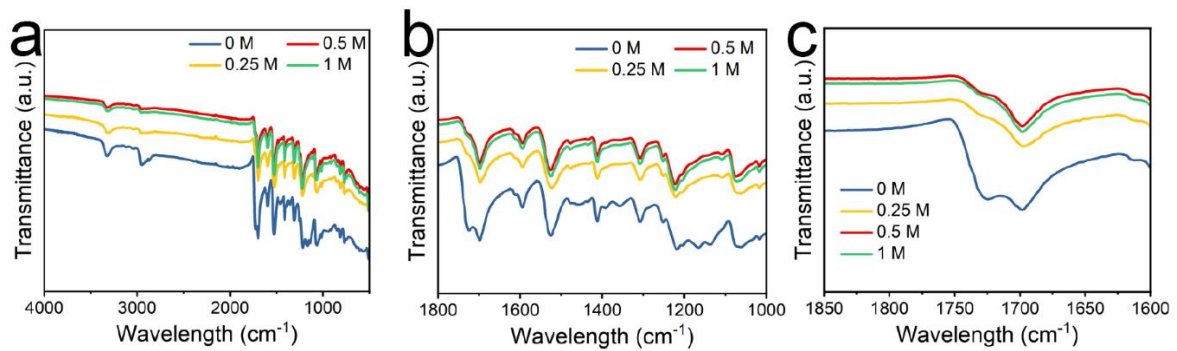


Fig. S6 FTIR of PU@MXene(20%) with alkali treatment in different concentration of NaOH solution. **a** 400-4000 cm^{-1} , **b** 1000-1800 cm^{-1} , **c** 1600-1850 cm^{-1}

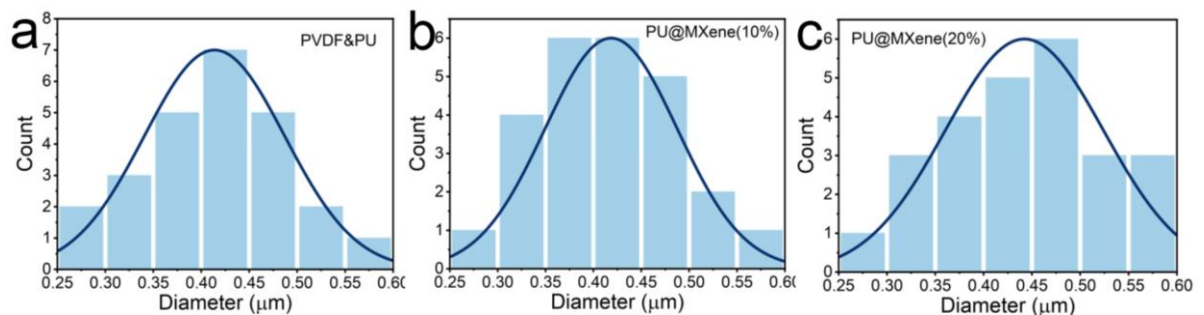


Fig. S7 Fiber diameter distribution of **a** PVDF&PU, **b** PU@MXene(10%), and **c** PU@MXene(20%)

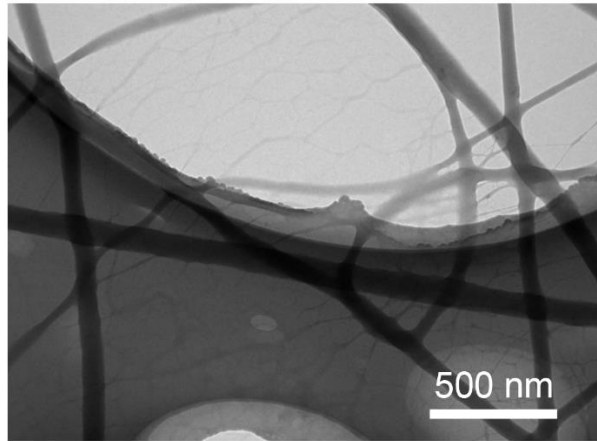


Fig. S8 TEM image of WGID membrane with 500 nm scale bar

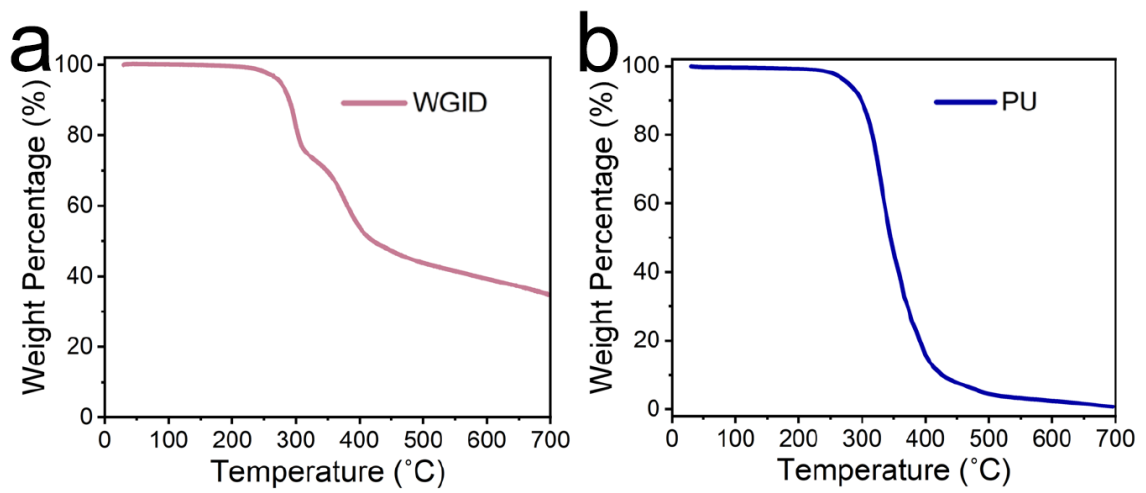


Fig. S9 TGA curves of **a** the WGID membrane, **b** PU membrane

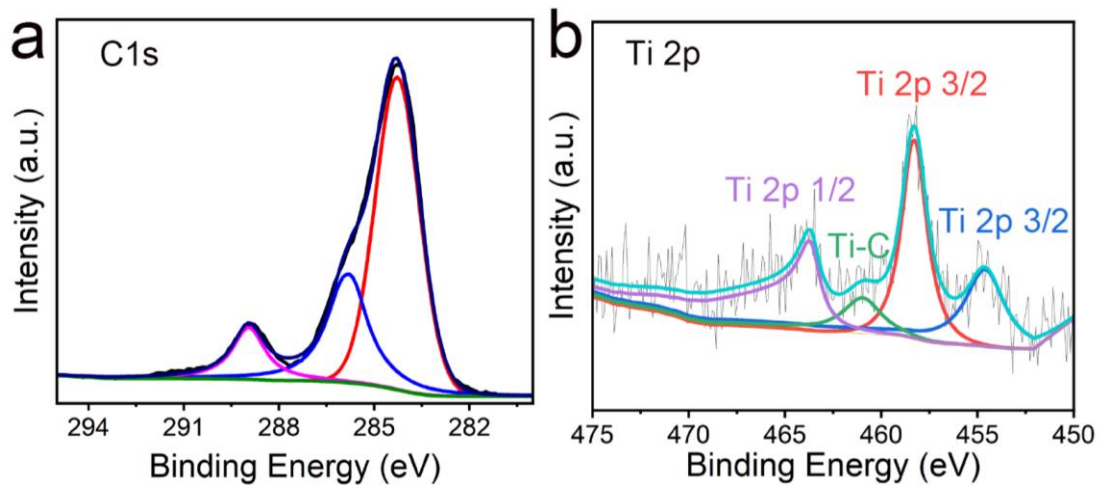


Fig. S10 XPS survey spectra of WGID membrane. **a** C 1s, and **b** Ti 2p high-resolution spectra

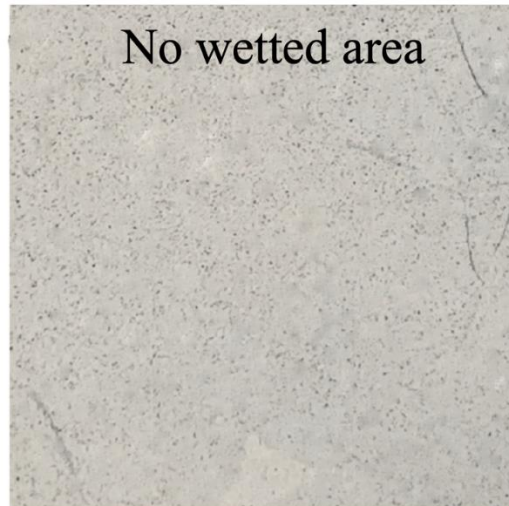


Fig. S11 Backside Photograph of WGID when water droplet was landed from hydrophilic side

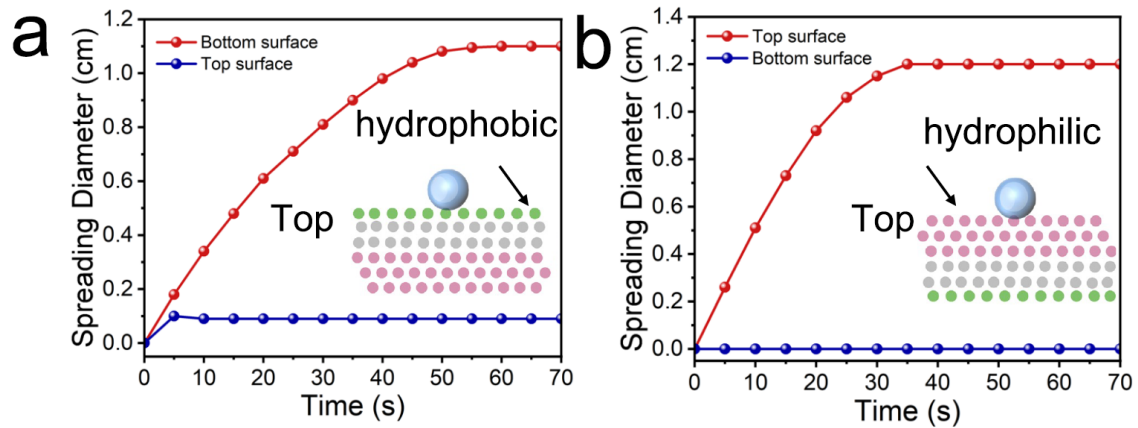


Fig. S12 Spreading diameter of the WGID membrane from different sides. **a** from hydrophobic side, **b** from hydrophilic side

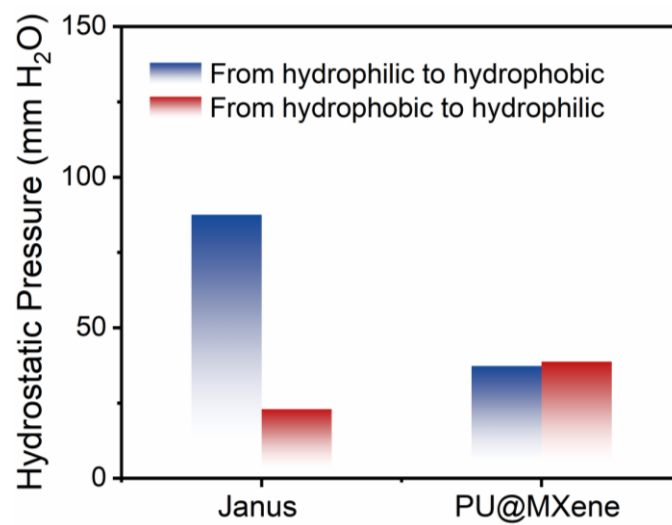


Fig. S13 Hydrostatic pressure of Janus membrane and PU@MXene(10%) membrane from both sides

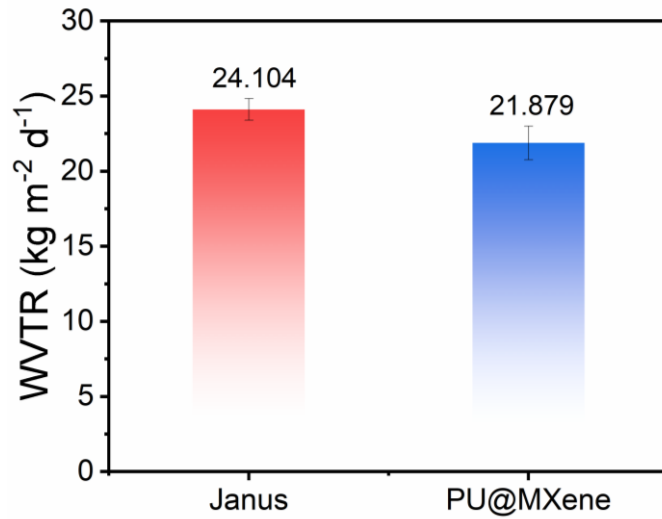


Fig. S14 WVT of Janus membrane and PU@MXene(10%) membrane

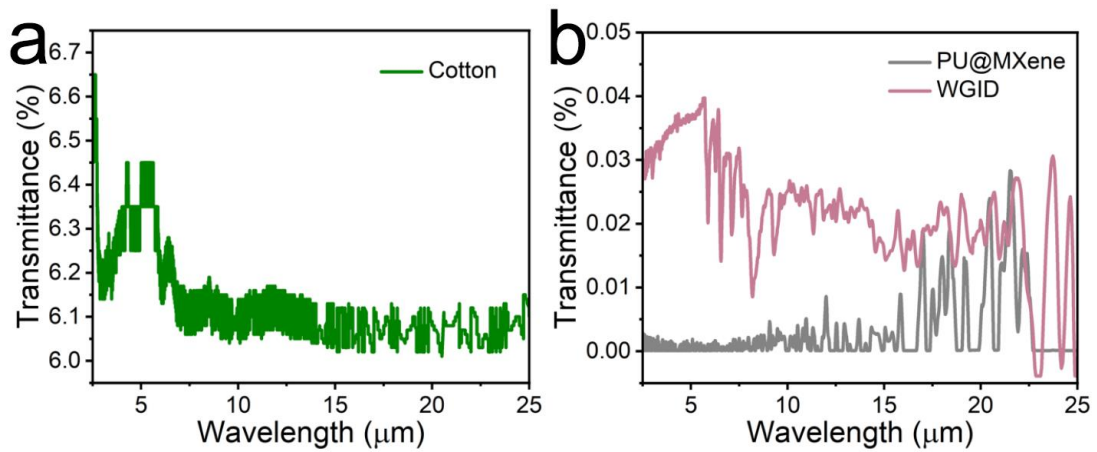


Fig. S15 The transmittance of **a** traditional cotton, **b** PU@MXene(20%) and the WGID membrane

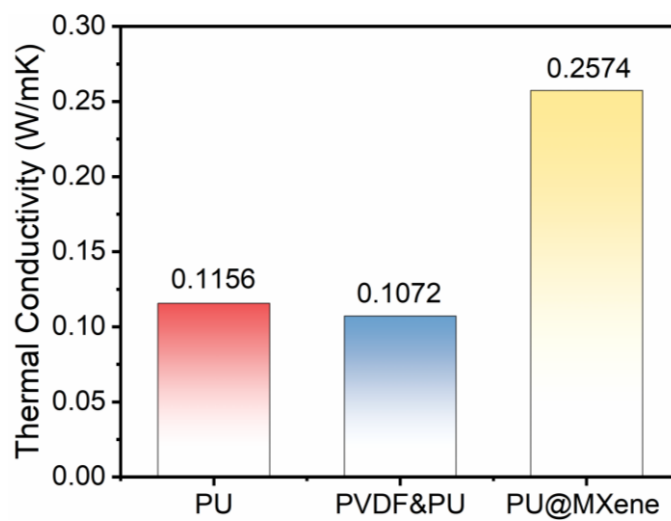


Fig. S16 Thermal conductivity of PU, PVDF&PU, and PU@MXene(10%)

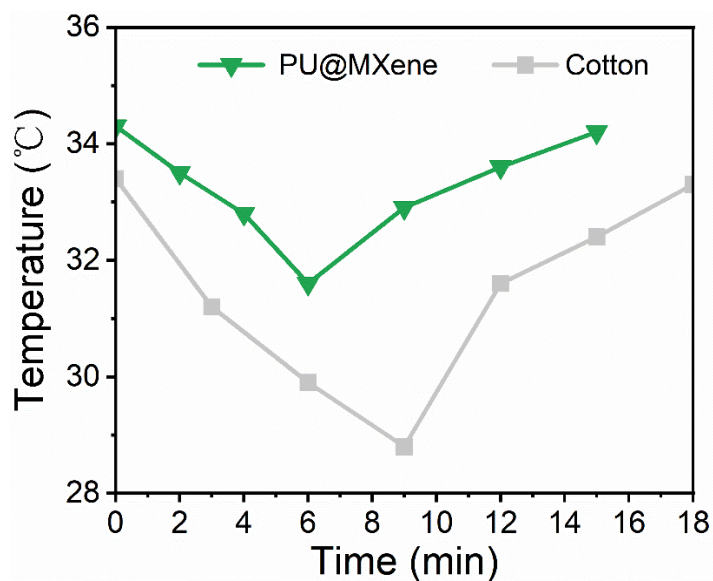


Fig. S17 Temperature change of PU@MXene, cotton.

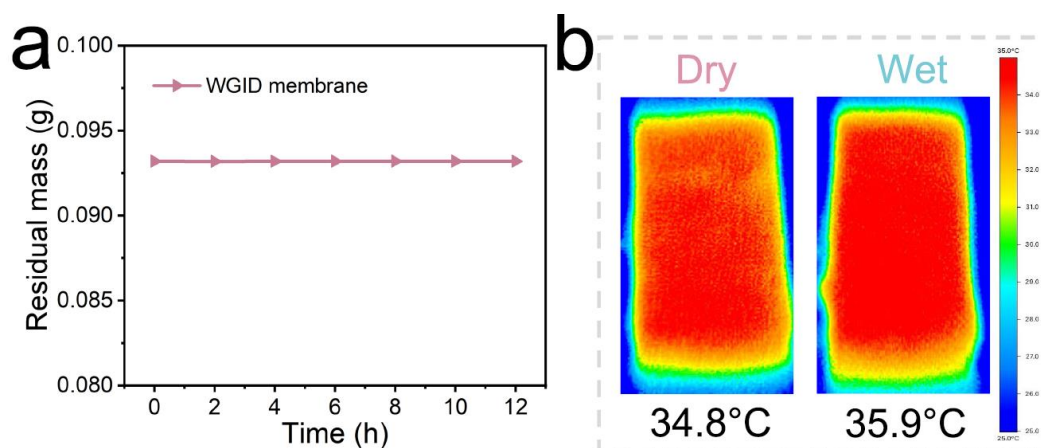


Fig. S18 a Residual mass of WGID membrane with processing different stirring time. **b** Thermal infrared images from dry state to wet state after washing for 12 hours

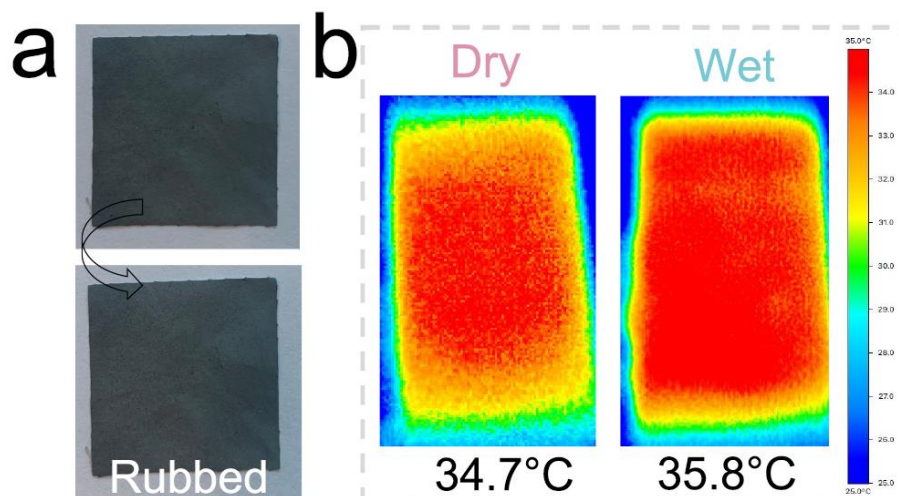


Fig. S19 a Photographs, **b** Thermal infrared images from dry state to wet state of the WGID membrane before and after being rubbed