

## **Leaf vein-inspired microfiltration membrane based on ultrathin nanonetworks**

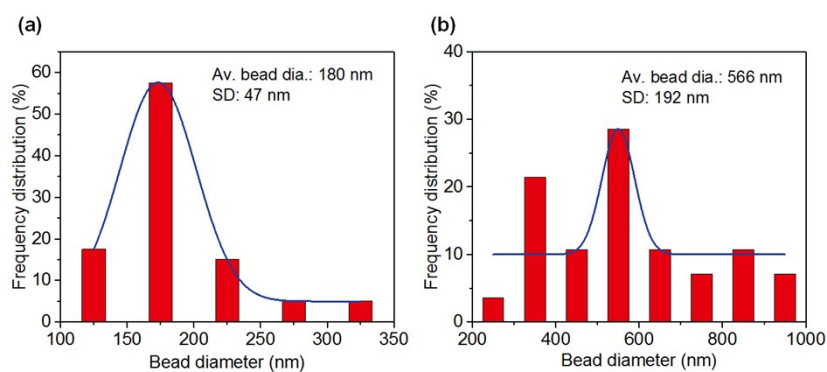
Ning Tang,<sup>a</sup> Yang Si,<sup>\*a,b</sup> Jianyong Yu,<sup>a,b</sup> and Bin Ding<sup>\*a,b</sup>

<sup>a</sup> *State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Textiles, Donghua University, Shanghai 201620, China*

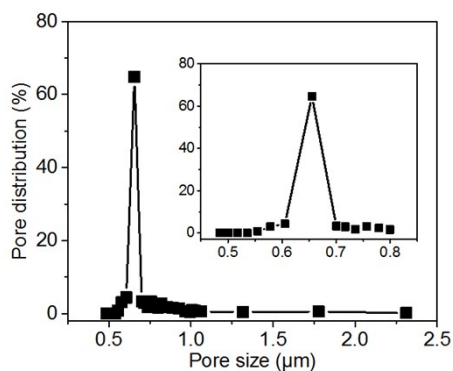
<sup>b</sup> *Innovation Center for Textile Science and Technology, Donghua University, Shanghai 200051, China.*

*\* Correspondence and requests for materials should be addressed to Y.S. (yangsi@dhu.edu.cn) and B.D. (binding@dhu.edu.cn)*

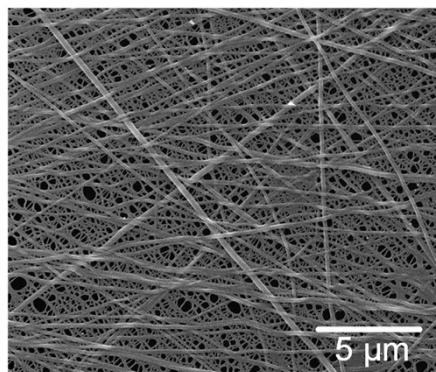
## Supplementary Information



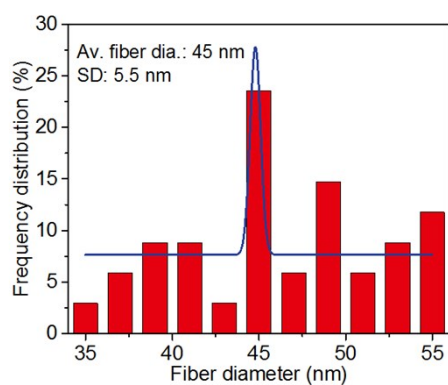
**Fig. S1** Diameter distributions of beads in PAN membranes prepared from solvent of (a) DMSO, and (b) DMF.



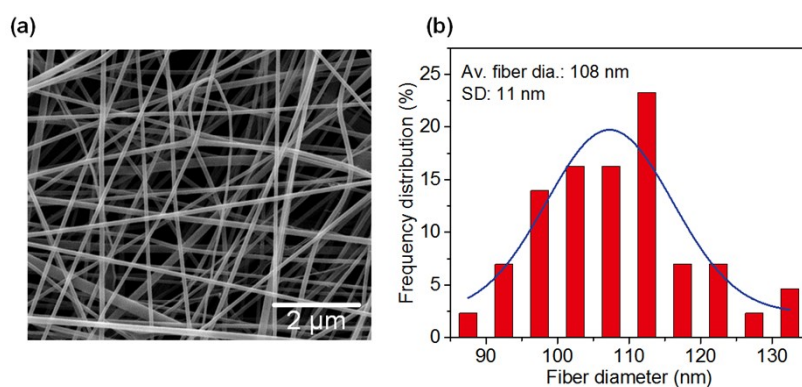
**Fig. S2** Pore size distribution (Inset: the corresponding enlarged graph) of PA NFM.



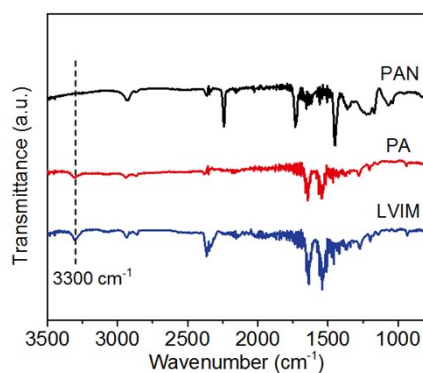
**Fig. S3** SEM image of LVIM with low magnification.



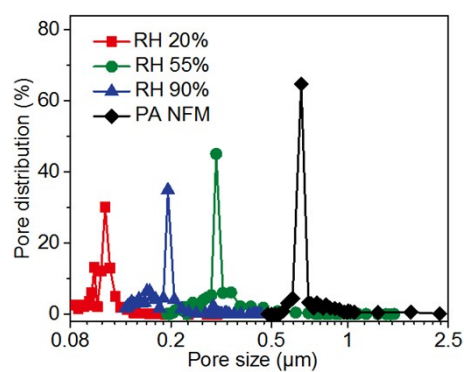
**Fig. S4** Fiber diameter distribution of nanonetworks in LVIM.



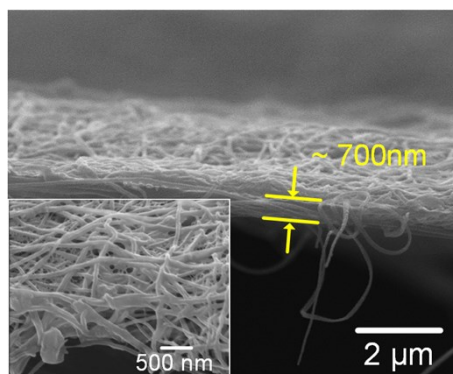
**Fig. S5** (a) SEM image, and (b) fiber diameter distribution of PA NFM.



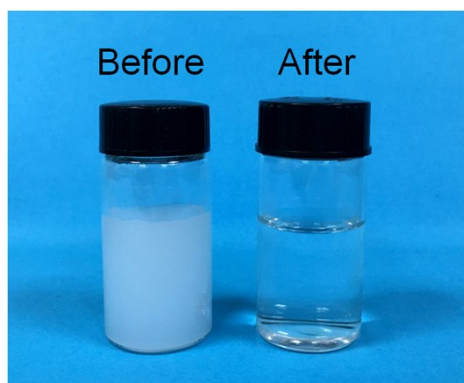
**Fig. S6** FT-IR spectra of PAN, PA, and LVIM.



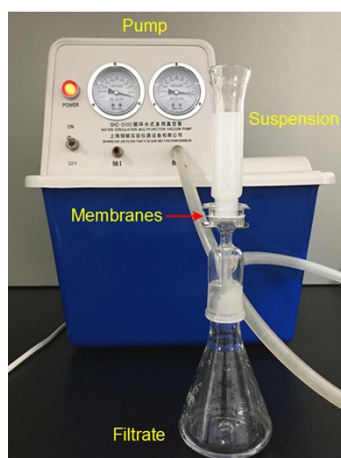
**Fig. S7** Pore size distribution of PAN membranes obtained at different RH conditions and the PA NFM substrate.



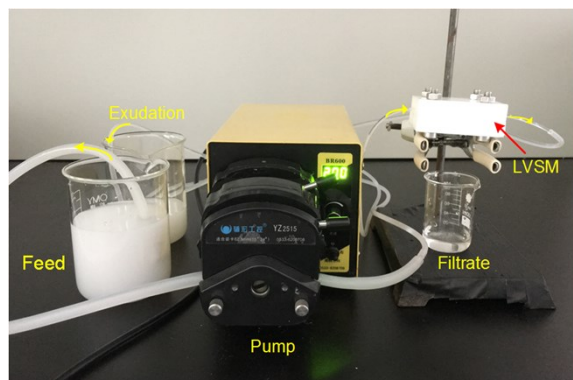
**Fig. S8** Cross-sectional SEM images of LVIM.



**Fig. S9** Photographs of TiO<sub>2</sub> suspension before and after filtration by the dead-end filtration system under the driving of 5 kPa.



**Fig. S10** Photograph demonstrating the process of microfiltration under the driving of external pressure using a dead-end filtration system.



**Fig. S11** Photograph showing the process of microfiltration using a cross-flow filtration system.

**Table S1.** LCP fitting equation for PAN-solvent-H<sub>2</sub>O systems at temperature of 25 °C.

Solvent	LCP fitting equation	R <sup>2</sup>
DMSO	$\ln(W_{\text{water}}/W_{\text{PAN}}) = 1.14\ln(W_{\text{DMSO}}/W_{\text{PAN}}) - 2.97$	0.9992
DMF	$\ln(W_{\text{water}}/W_{\text{PAN}}) = 1.16\ln(W_{\text{DMF}}/W_{\text{PAN}}) - 2.86$	0.9996
NMP	$\ln(W_{\text{water}}/W_{\text{PAN}}) = 1.22\ln(W_{\text{NMP}}/W_{\text{PAN}}) - 2.70$	0.9999
DMAc	$\ln(W_{\text{water}}/W_{\text{PAN}}) = 1.18\ln(W_{\text{DMAc}}/W_{\text{PAN}}) - 2.78$	0.9999

**Movie S1:** Microfiltration at the driving pressure of 5 kPa by using dead-end filtration system.