Electronic Supplementary Material (ESI) for Nanoscale.
This journal is © The Royal Society of Chemistry 2023

Multifunctional polyimide-based micro/nanostructured films with triple Janus property achieved by Femtosecond laser

Jiaqing Pei,[a] Kai Yin*[a,b] , Tingni Wu [a], Lingxiao Wang,[a] Qinwen Deng[a] , Yin Huang,[a] Kai Wang[c],Christopher J. Arnusch[d]

[a] *Hunan Key Laboratory of Nanophotonics and Devices, School of Physics and Electronics, Central South University, Changsha, 410083, China.*

[b] *State Key Laboratory of Precision Manufacturing for Extreme Service Performance, College of Mechanical and Electrical Engineering, Central South University, Changsha 410083, China.*

[c] *School of Electrical Engineering, Weihai Innovation Research Institute, Qingdao University, Qingdao 266000, China.*

[d] *Department of Desalination and Water Treatment, Zuckerberg Institute for Water Research, the Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Sede-Boqer Campus, Midreshet Ben-Gurion 84990, Israel*

This file contains Supplementary Experimental Section, Figures S1-S10.

*To whom correspondence should be addressed.

*Corresponding author: kaiyin@csu.edu.cn

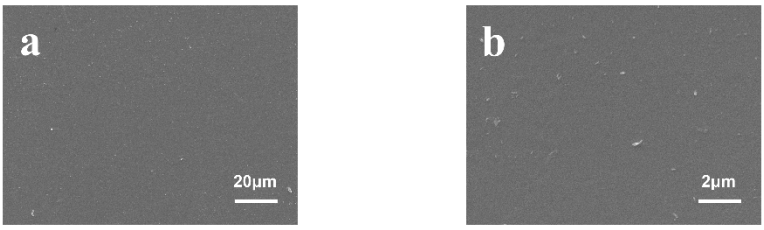

Figure S1.SEM images of pristine PI surface.

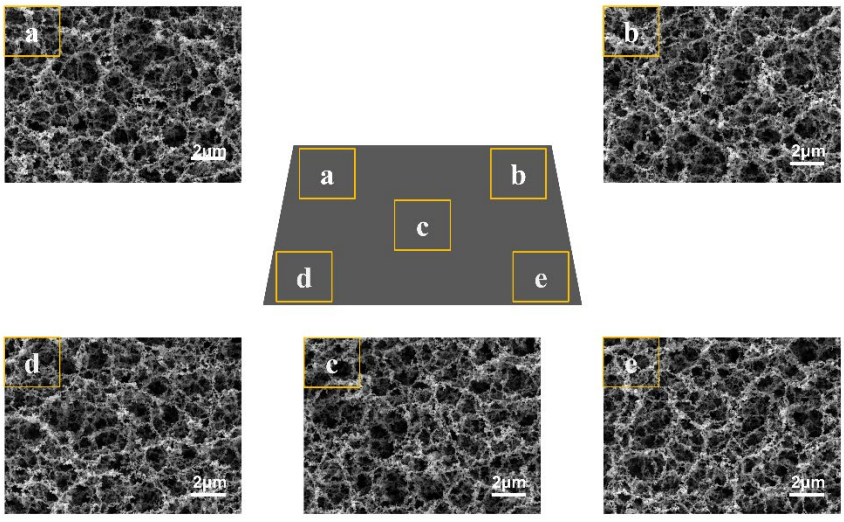

Figure S2.SEM images of various positions of the HPS surface.

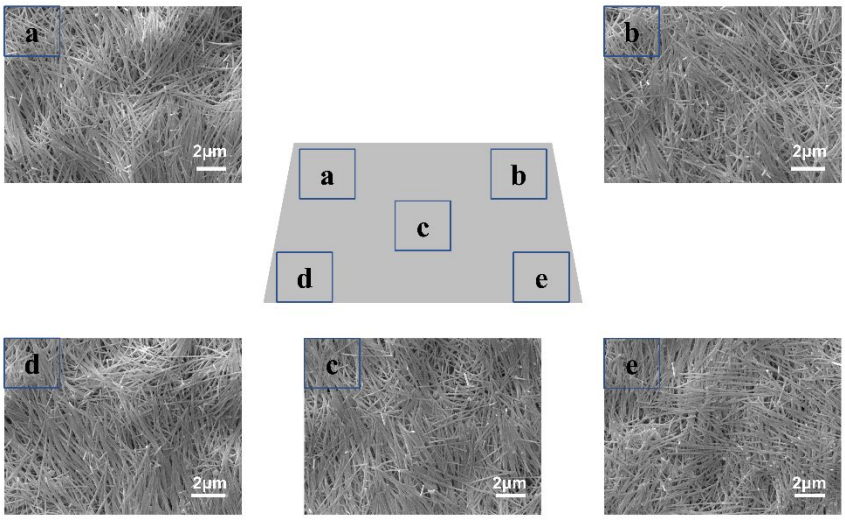

Figure S3.SEM images of various positions of the AGNWs@LLS surface.

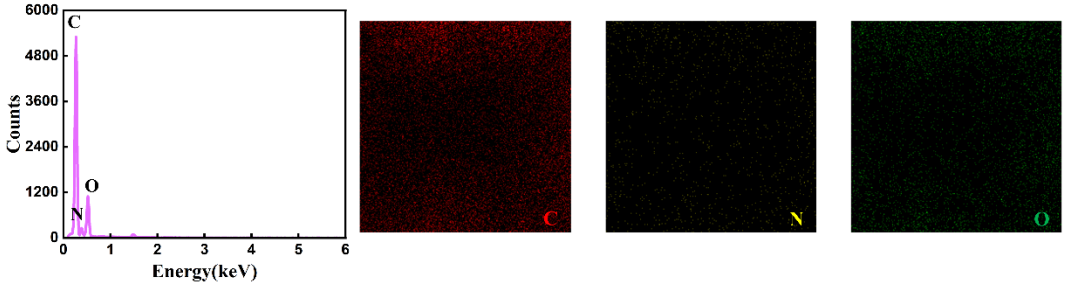

Figure S4. Elemental chemical composition and maps of pristine PI surface.

a

Element	Weight%	Atomic%
C K	51.27	57.14
N K	17.55	16.77
O K	31.18	26.09

b

Element	Weight%	Atomic%
C K	78.41	82.06
N K	8.77	7.87
O K	12.82	10.07

c

Element	Weight%	Atomic%
C K	58.87	64.63
N K	12.46	11.73
O K	28.68	23.64

d

Element	Weight%	Atomic%
C K	4.71	28.77
N K	0.25	1.32
O K	1.06	4.87
Cl K	0.84	1.74
Ag L	93.13	63.30

Figure S5. Elemental content of **a** pristine PI, **b** HPS, **c** LLS and **d** AGNWs@LLS surfaces.

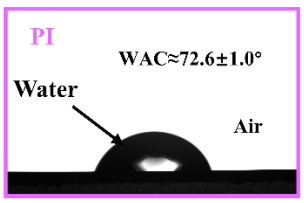

Figure S6. Static water contact angle of pristine PI surface.

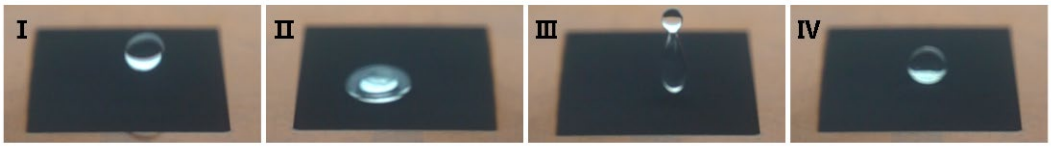

Figure S7. The process of water impacting the HPS surface.

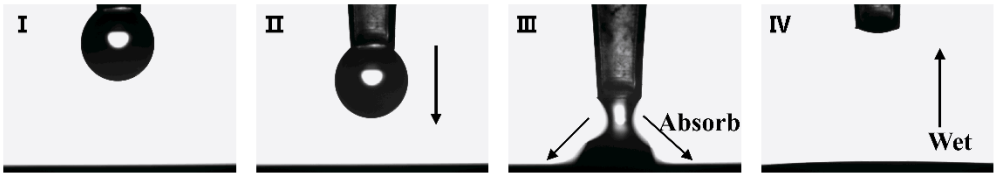

Figure S8. Dynamic wetting behaviors of a water droplet (3 μL) on LLS surface.

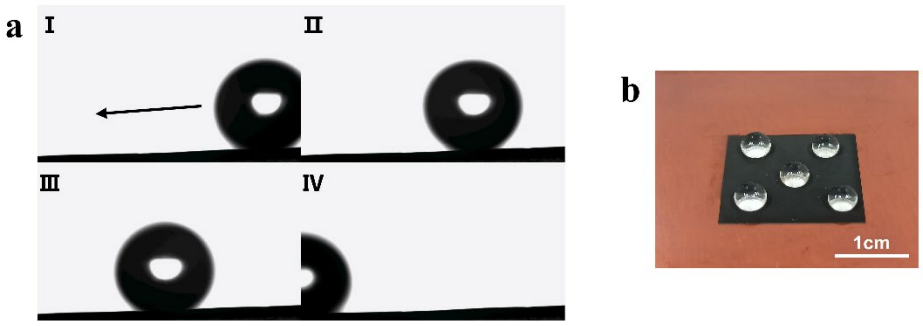

Figure S9. a A water droplet sliding on the HPS surface. **b** WACs of various positions for the HPS surface.

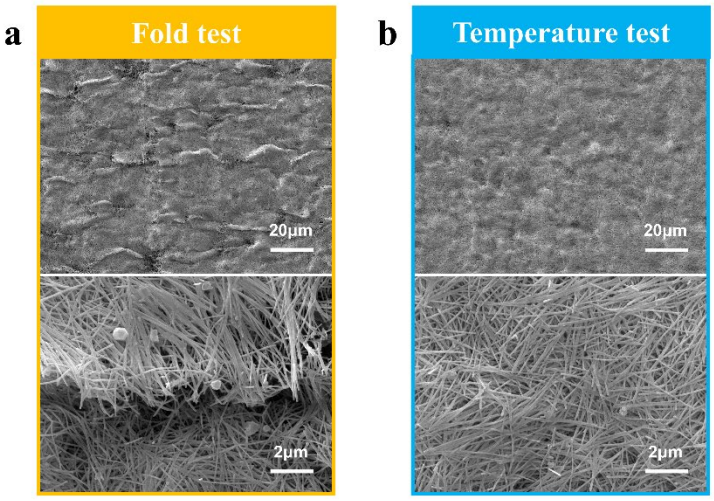

Figure S10.SEM images of AGNWs@LLS surface under **a** fold test and **b** temperature test.