

## Supporting Information

Highly transparent, healable and durable anti-fogging coating by combining hydrophilic pectin and tannic acid with the poly(ethylene terephthalate)

Tao Zhang,<sup>\*a,b</sup> Lanlan Fang,<sup>b</sup> Nan Lin,<sup>a</sup> Jiajun Wang,<sup>a,b</sup> Yongguang Wang,<sup>c</sup> Tao Wu<sup>a</sup> and Pingan Song,<sup>\*d,e</sup>

<sup>a</sup> *Department of Visual Communication Design, School of Art & Design, Zhejiang Sci-Tech University, Hangzhou 310018, China. E-mail: taoyuan0510@126.com*

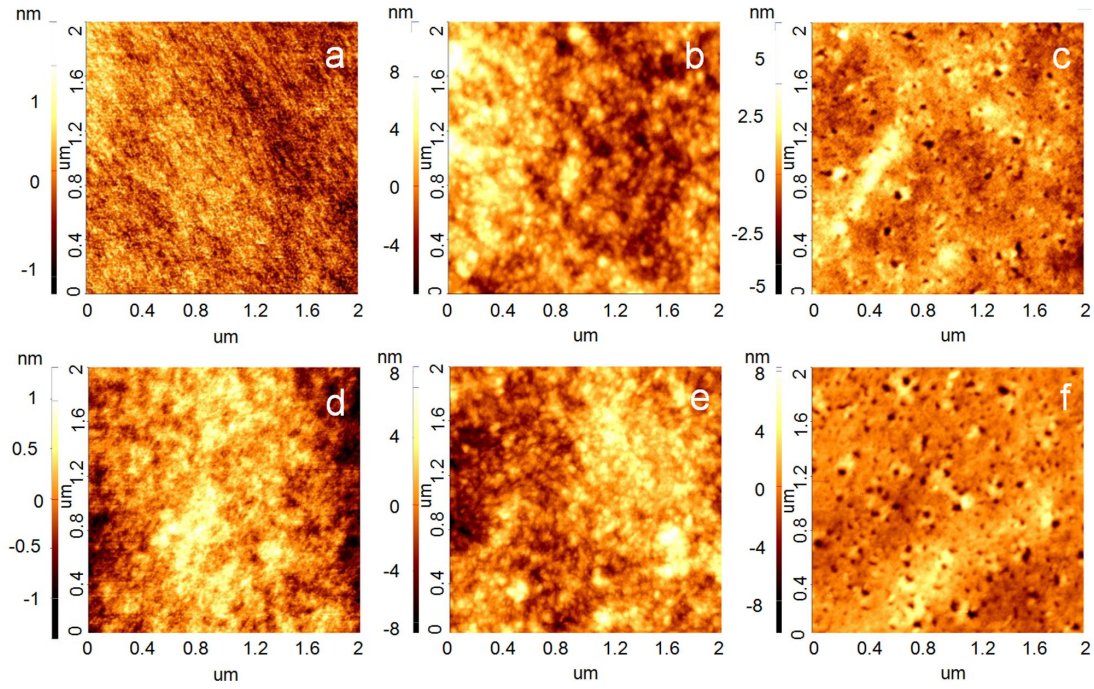
<sup>b</sup> *MOE Key Laboratory of Advanced Textile Materials and Manufacturing Technology, College of Materials and Textiles, Zhejiang Sci-Tech University, Hangzhou 310018, China*

<sup>c</sup> *School of Mechanical and Electric Engineering, Soochow University, Suzhou 215021, China*

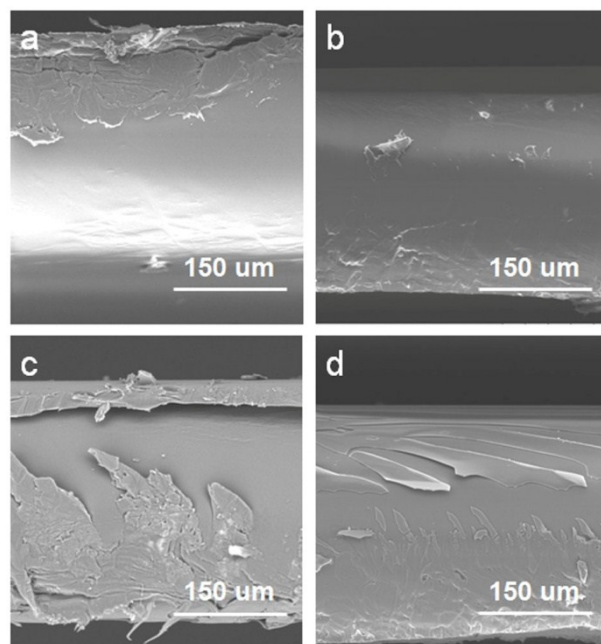
<sup>d</sup> *Center for Future Materials, University of Southern Queensland, Queensland 4350, Australia. E-mail: pingansong@gmail.com*

<sup>e</sup> *School of Engineering, Zhejiang A&F University, Hangzhou 311300, China*

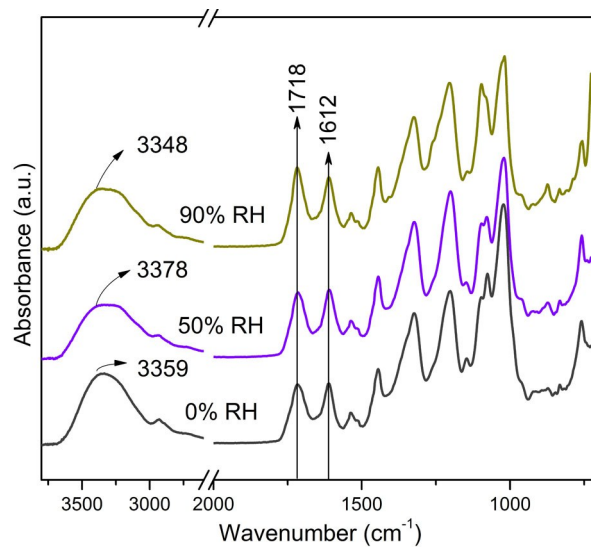
**Fig. S1** The AFM height images of PET-TA (a, d), PET-pectin (b, e) and PET-pectin/TA (c, f) after conditioning at 0 (first row) and 90 (second row) % RH at 20 °C for 24 hours ( $R_q$  values: a, 0.517 nm; b, 2.437 nm; c, 0.984 nm; d, 0.352 nm; e, 2.143 nm; f, 1.579 nm).



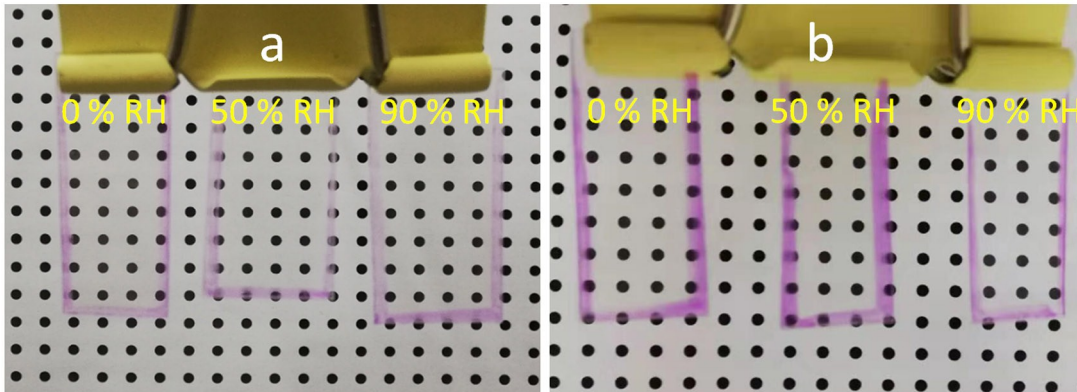
**Fig. S2** The cross-sectional SEM images of PET (a), PET-TA (b), PET-pectin (c) and PET-pectin/TA (d).



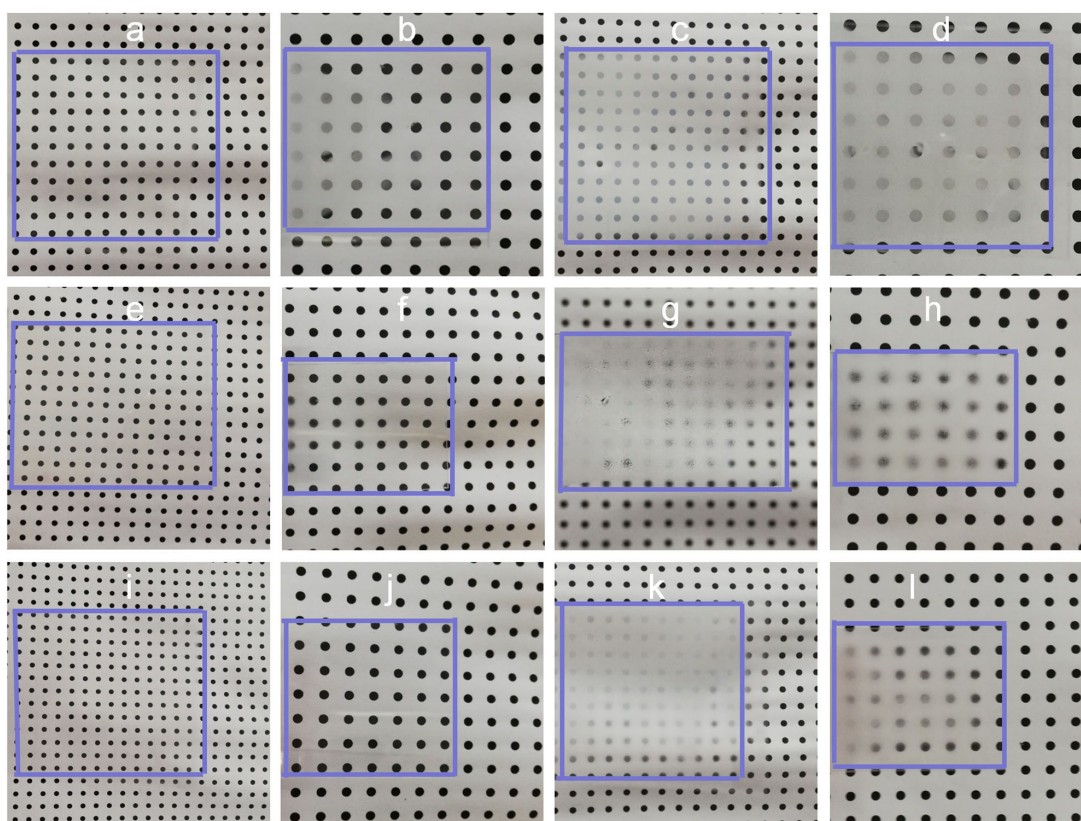
**Fig. S3** The ATR-FTIR spectra of PET-pectin/TA after conditioning at 0, 50 and 90 % RH at 20 °C for 24 hours.



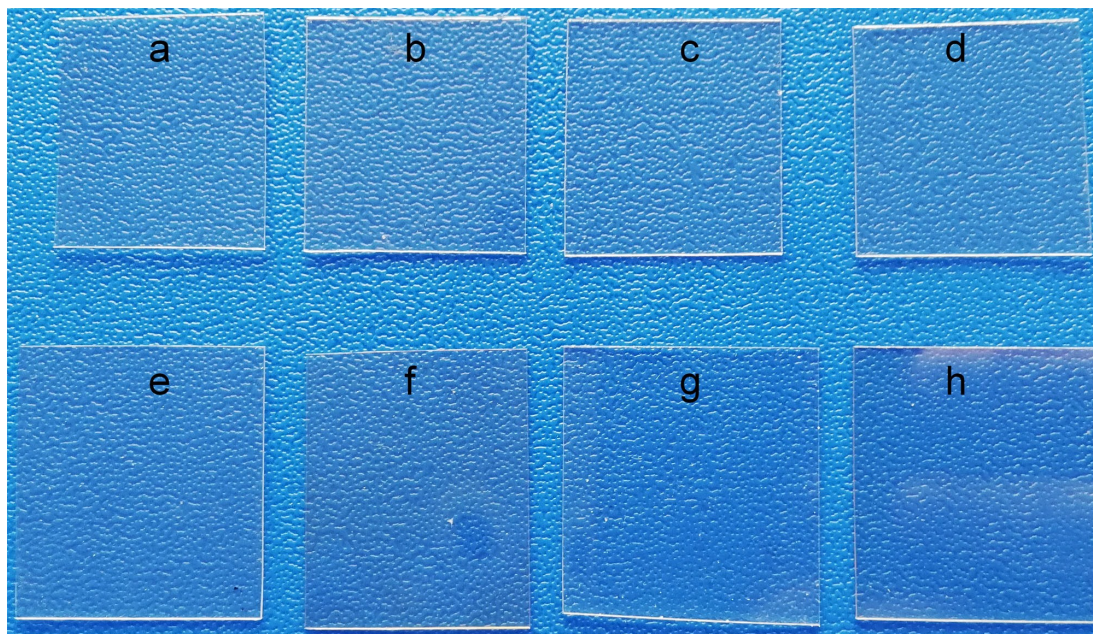
**Fig. S4** The digital images of PET-pectin/TA after holding about 5 cm over the boiling water ( $\sim 55\text{ }^{\circ}\text{C}$ , 100 % RH) for 60 s (a) and after storing in a freezer at about  $-20\text{ }^{\circ}\text{C}$  for 1h and exposing to the condition of  $\sim 20\text{ }^{\circ}\text{C}$  and 50 % RH for 5 s (b) after conditioning at 0, 50 and 90 % RH at  $20\text{ }^{\circ}\text{C}$  for 24 hours.



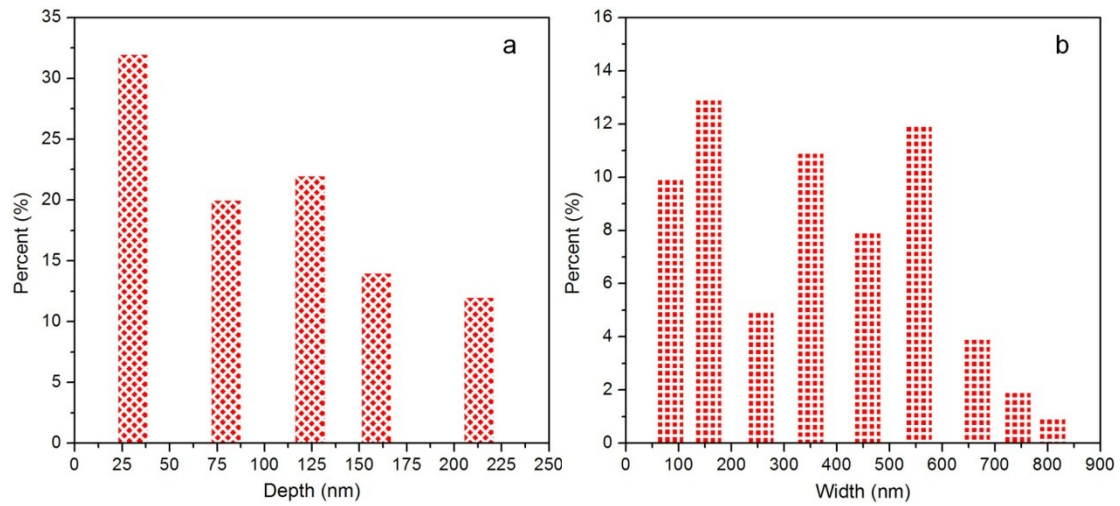
**Fig. S5** The anti-fogging performances of PET-pectin/TA after immersing in the pH buffer solutions at room temperature with pH values of 12.0 (first row), 7.0 (second row) and 2.0 (third row). First and third columns: after holding about 5 cm over the boiling water ( $\sim 55\text{ }^{\circ}\text{C}$ , 100 % RH) for 60 s, second and fourth columns: after storing in a freezer at about  $-20\text{ }^{\circ}\text{C}$  for 1h and exposing to the condition of  $\sim 20\text{ }^{\circ}\text{C}$  and 50 % RH for 5 s, first and second columns: 1 time of immersing, c and d: 2 times of immersing, g and h: 4 times of immersing, k and l: 6 times of immersing.



**Fig. S6** The digital images of PET (a, e), PET-TA (b, f), PET-pectin (c, g) and PET-pectin/TA (d, h) before (first row) and after (second row) exposure to UV irradiation (UVA 365 nm) for 4 weeks.



**Fig. S7** The depth (a) and width (b) distributions of the damaged cut on the surface of PET-pectin/TA obtained from the AFM image.





**Fig. S8** The digital images of PET-pectin/TA before (a) and after (b) 3 cycles of scratching and healing processes.

