**Supporting Information**

# A solvent-free thermocuring electrospinning to fabricate ultrathin polyurethane fibers with high conductivity by in-situ polymerization of polyaniline

Hong-Wei He,[‡a,b] Bin Zhang,[‡a] Xu Yan,[a,c] Rui-Hua Dong,[a] Xian-Sheng Jia,[a]

Gui-Feng Yu,[a,b] Xin Ning,[c] Lin-Hua Xia,[a] and Yun-Ze Long[*a,c]

[a.] *Collaborative Innovation Center for Nanomaterials & Devices, College of Physics, Qingdao University, Qingdao 266071, China. E-mail: yunze.long@163.com or yunze.long@qdu.edu.cn*

[b.] *College of Materials Science & Engineering, Qingdao University, Qingdao 266071, China*

[c.] *Industrial Research Institute of Nonwovens & Technical Textiles, College of Textiles & Clothing, Qingdao University, Qingdao 266071, China*

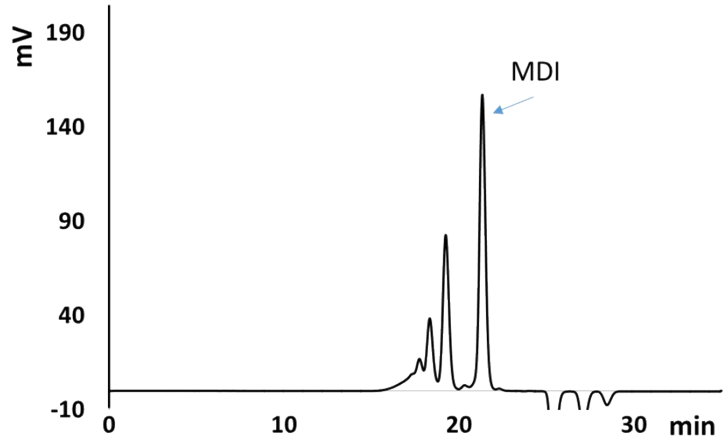


**Fig. S1** GPC spectrum of PU prepolymer.

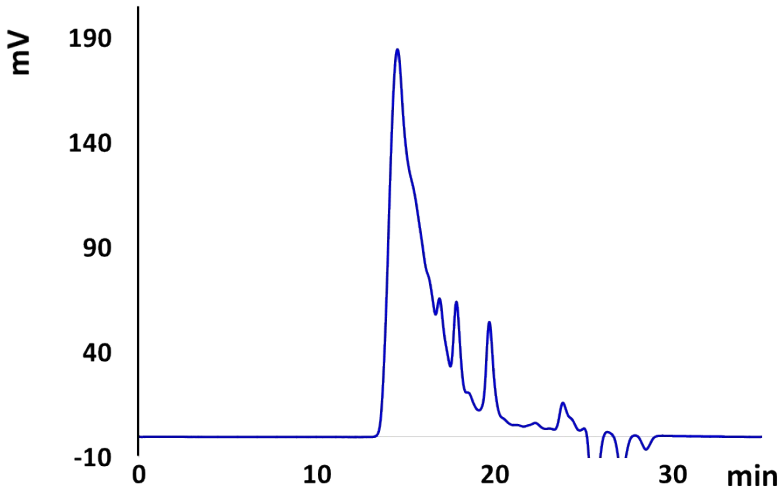

**Fig. S2** GPC spectrum of as-pun PU fibers.

Molecular weights of PU prepolymer and as-spun PU fibers were determined with a gel permeation chromatography (GPC) system (Tosoh EcoSEC HLC-8320GPC) including a refractive index detector. As shown in Fig. S1, the ratio of MDI:PTMG-500 was 3.5:1 when synthesizing prepolymer and the main component MDI appeared at 21.37 min in the GPC spectrum. Then PEG-400 (2.5 equivalent) was added for chain extending and e-spinning, and the molecular weight of the as-spun PU fibers was about 50,000, which appeared at 14.5 min in the GPC spectrum (Fig. S2). It can be concluded that the oligomer and the remained MDI in the prepolymer have reacted with chain extender and converted into solid PU fibers.

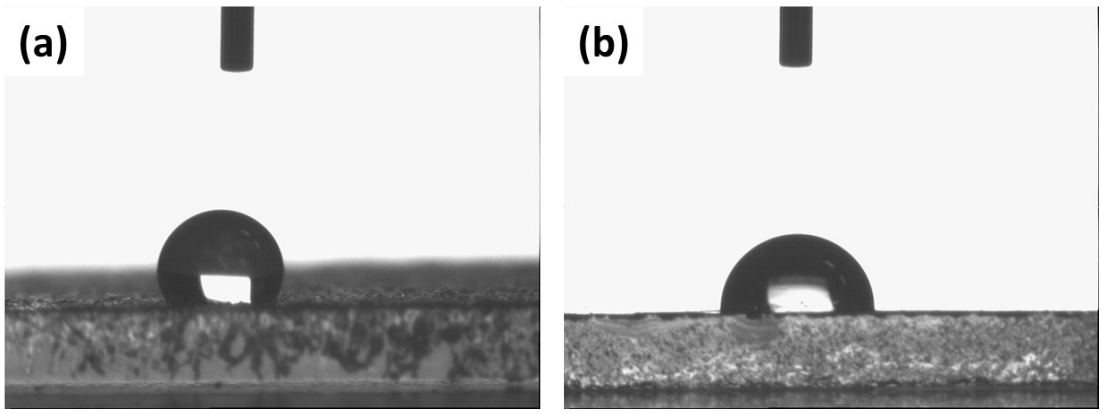


**Fig. S3** Contact angles of e-spun fibrous mats: (a) PU and (b) PU-COOH.

Contact angles of the e-spun fibrous mats of pure PU and PU-COOH were examined by static water contact angle measurement (DSA100). Deionized water (3.0 μL) was automatically dropped onto the flat fibrous mats. The contact angles were calculated automatically: (a) 110.9° for e-spun fibrous PU mat and (b) 92.7° for fibrous PU-COOH mat, respectively.

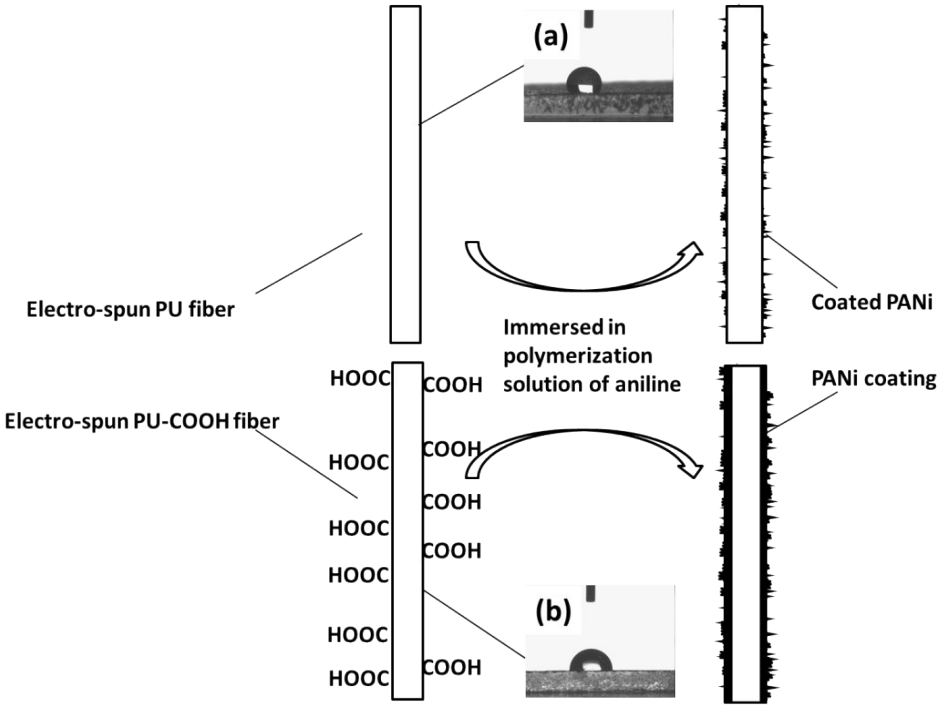


**Fig. S4** Proposed mechanism of *in situ* polymerization of aniline on the surface of as-spun (a) PU and (b) PU-COOH fibers.

E-spun PU and PU-COOH fibers were immersed into the aniline solution containing oxidant APS and dopant CAS. Then nanostructured PANi layers were in situ polymerized on the surfaces of PU and PU-COOH fibers.