

Electronic Supplementary Information

Facile Surface Functionalization of Triboelectric Layers via Electrostatically Self-Assembled Zwitterionic Molecules for Achieving Efficient and Stable Antibacterial Flexible Triboelectric Nanogenerators

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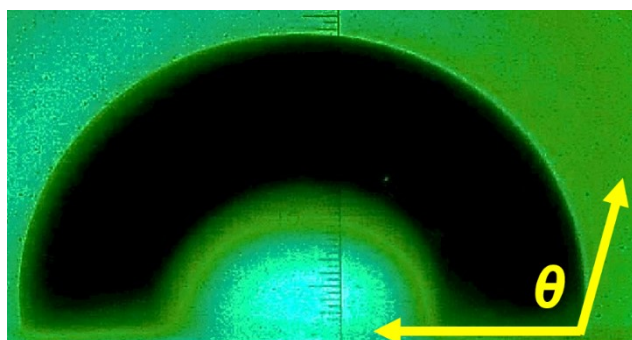


Fig. S1. Water contact angle analysis of PDMS layer.

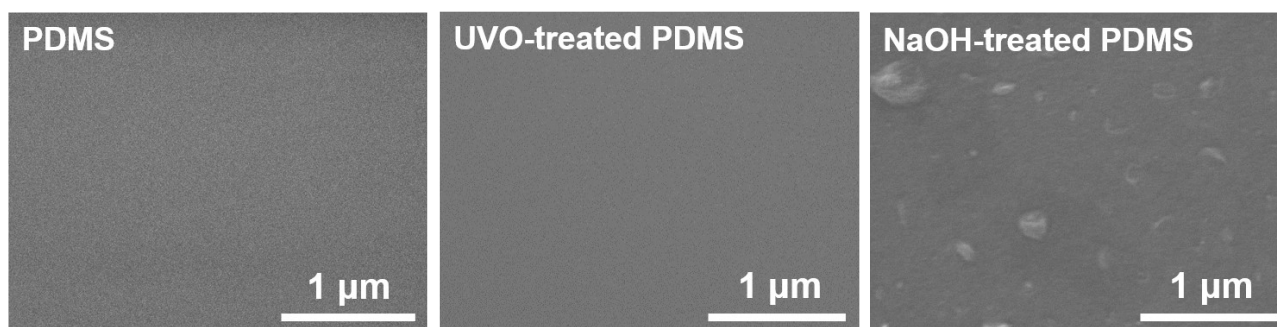


Fig. S2. Top-view SEM images of the samples.

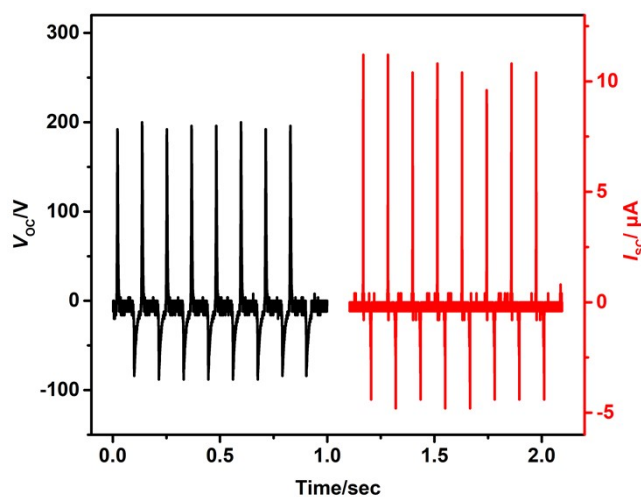


Fig. S3. Output characterization of TENG based on UVO-treated PDMS/NDSB.

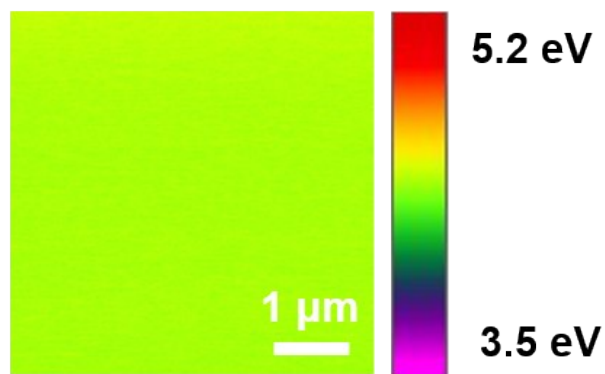


Fig. S4. KPFM image of UVO-treated PDMS/NDSB.

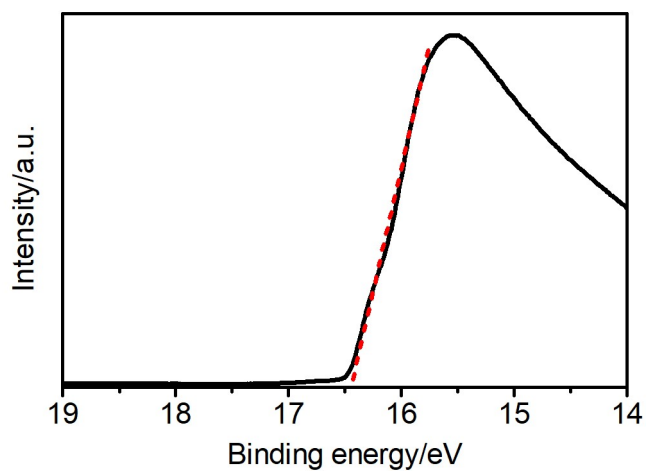


Fig. S5. UPS spectrum of NaOH-treated PDMS.

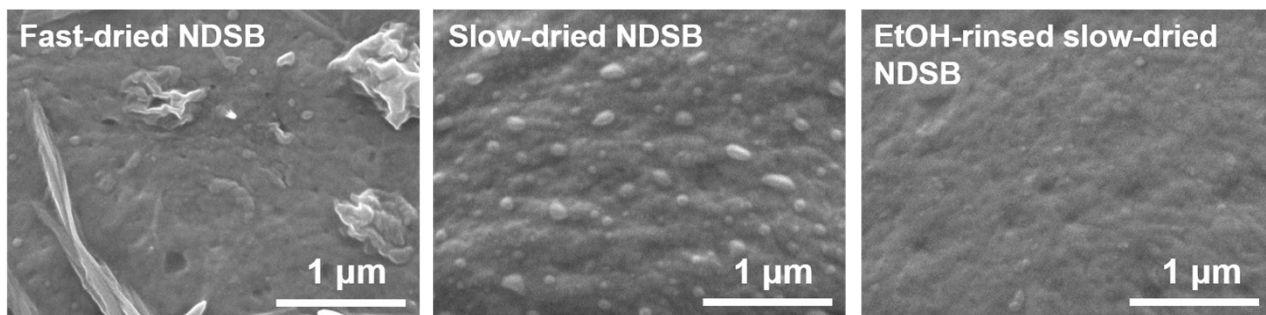


Fig. S6. Top-view SEM images of the samples.

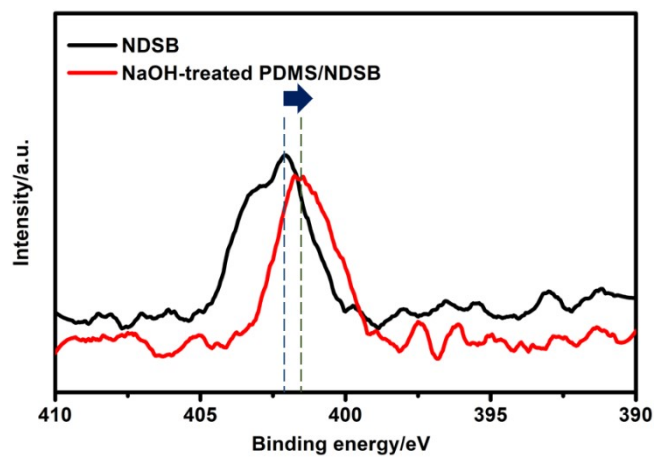


Fig. S7. High-resolution XPS of N 1s spectra of the samples.

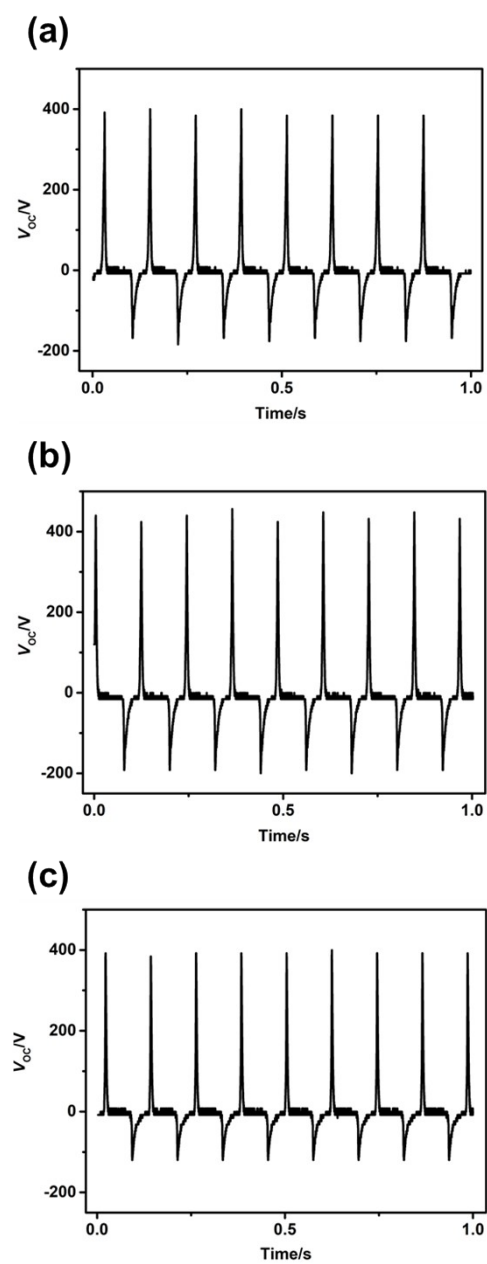


Fig. S8. V_{oc} output characteristics of TENG based on various concentration of NDSB: (a) 5 mg mL^{-1} , (b) 10 mg mL^{-1} , and (c) 20 mg mL^{-1} .

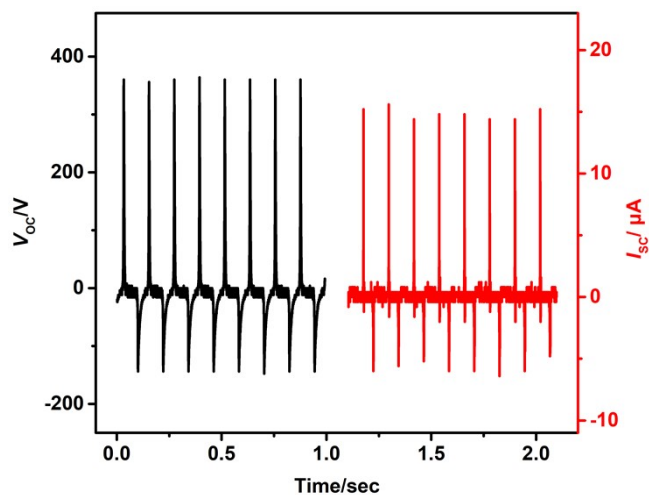


Fig. S9. Output characterization of TENG based on PDMS layer functionalized with fast-dried NDSB film after rinsing with EtOH.

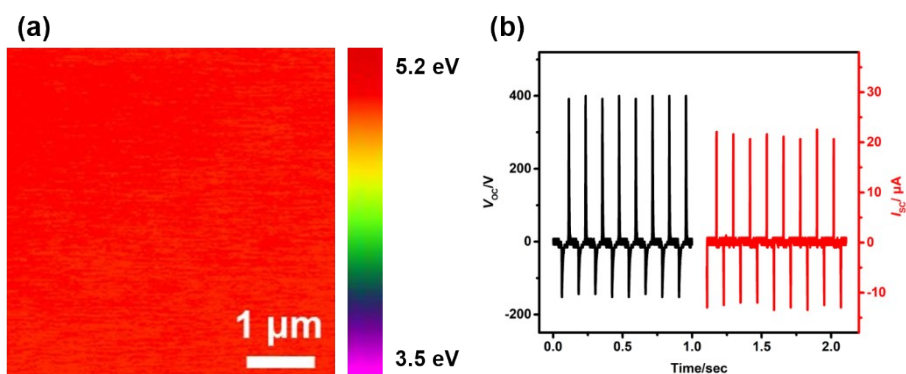


Fig. S10. (a) KPFM image of NDSB-functionalized PDMS layer after rinsing with EtOH. (b) Output characterization of TENG based on NDSB-functionalized PDMS layer after rinsing with EtOH.

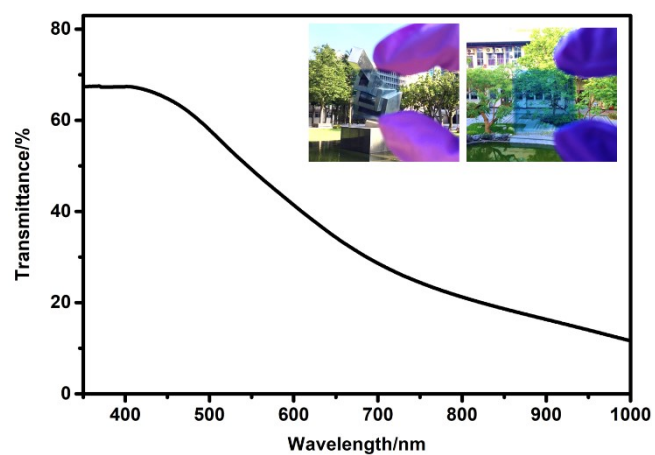


Fig. S11. Transmittance spectrum of DMSO-treated PEDOT:PSS layer (inset: photographs of DMSO-treated PEDOT:PSS layer).

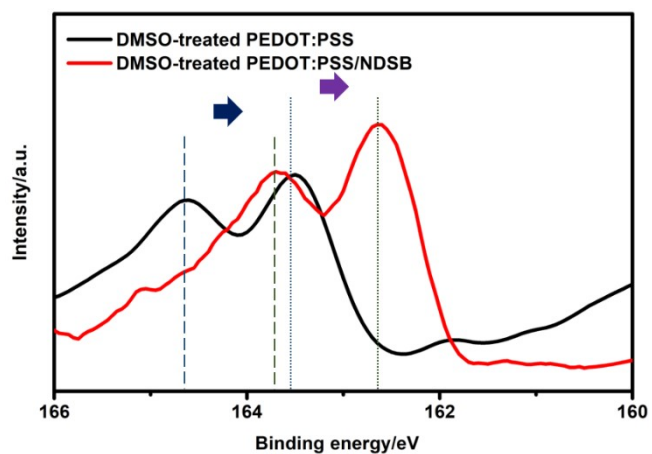


Fig. S12. High-resolution XPS of S 2p spectra of the samples.

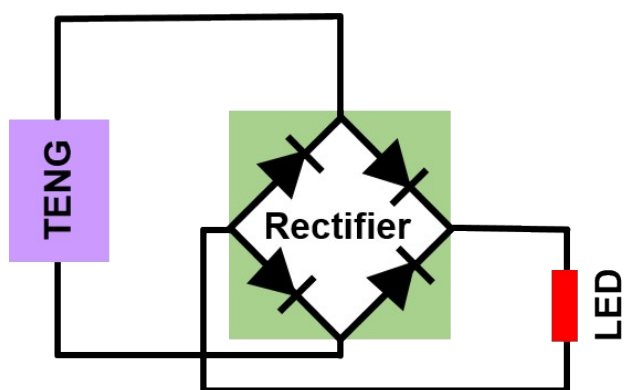


Fig. S13. Electrical circuit diagram for lighting up LEDs by TENG

Biomedical Verification Laboratory Analysis/ Test Report

Date Received: 2023.07.26
Assignment No: 112A011-D210443-FRE

Applicant: National Taiwan University of Science and
Technology
Address: Room E1-238, No. 43, Section 4, Keelung
Road, Daan District, Taipei City 106335,
Taiwan (R.O.C.)
Articles: NDSB-modified PDMS

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Authorized by Zhuang Jinyuan

Date: 2023.09.06





Biomedical Verification Laboratory Analysis/ Test Report

Application No : 112A011-D210443-FRE

Date Tested : 2023.08.01

Item(s)/ Method(s)	Result(s)	Note
1. Antimicrobial Effectiveness Test Ref. JIS Z2801-	Name of Test bacteria (Strain Number)	<i>Escherichia coli</i> (ATCC 8739)
	Concentration of inoculum	2.6×10^5 CFU/ml
	Average of the number of viable bacteria immediately after inoculation on the control sample (U_0)	6.5×10^3 CFU/cm ² (Log : 3.81)
	Average of the number of viable bacteria on the control sample after 24 hours (U_t)	1.3×10^6 CFU/cm ² (Log : 6.11)
	Average of the number of viable bacteria on the antimicrobial test piece after 24 hours (A_t)	< 0.63 CFU/cm ² (Log : < -0.2)
	Value of antimicrobial activity (R)	> 6.31

REMARK:

1. Antimicrobial Effectiveness Test
 - 1.1 Reaction time: 24 hours
 - 1.2 CFU: Colony- forming unit.
 - 1.3 Culture conditions: 35 ± 1 °C, 40~48 hours.
 - 1.4 Calculation : $R = (U_t - U_0) - (A_t - U_0) = U_t - A_t$
 - 1.5 If the R value exceeds 2.0, it indicates that the test article demonstrates significant antimicrobial efficacy.
 - 1.6 The photo of sample: Attached photo 1.
 - 1.7 The photo of test results: Attached photo 2~3.
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Fig. S14. Antibacterial properties of NDSB-functionalized PDMS layer certified by a Taiwan-accredited testing center (Plastics Industry Development Center).

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