

Supporting Information

**Three-dimensional polydimethylsiloxane/barium titanate elastomer networks for piezoelectric energy harvesters**

Yuanbiao Gong<sup>1</sup>, Weijia Wang<sup>1,\*</sup>, Xiuzi Che<sup>1</sup>, Yao Su<sup>1</sup>, Yuxin Jia<sup>2</sup>, Xiaohu Ren<sup>3,\*</sup>, Huiqing Fan<sup>1,\*</sup>

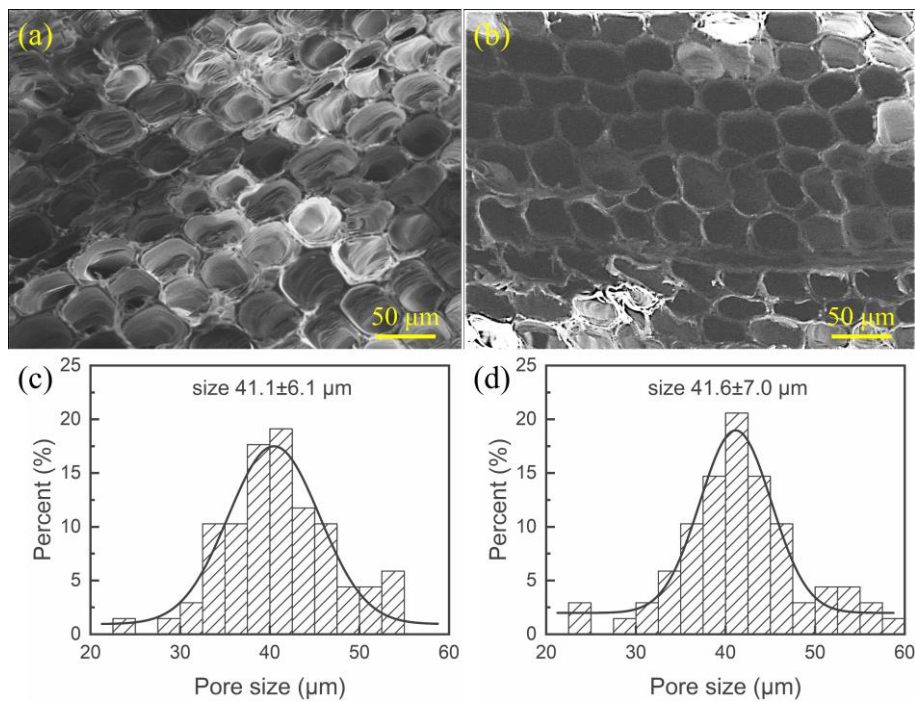
*1 State Key Laboratory of Solidification Processing, School of Materials Science and Engineering, Northwestern Polytechnical University, Xi'an 710072, China*

*2 School of Electronics and Information, Northwestern Polytechnical University, Xi'an 710072, P. R. China*

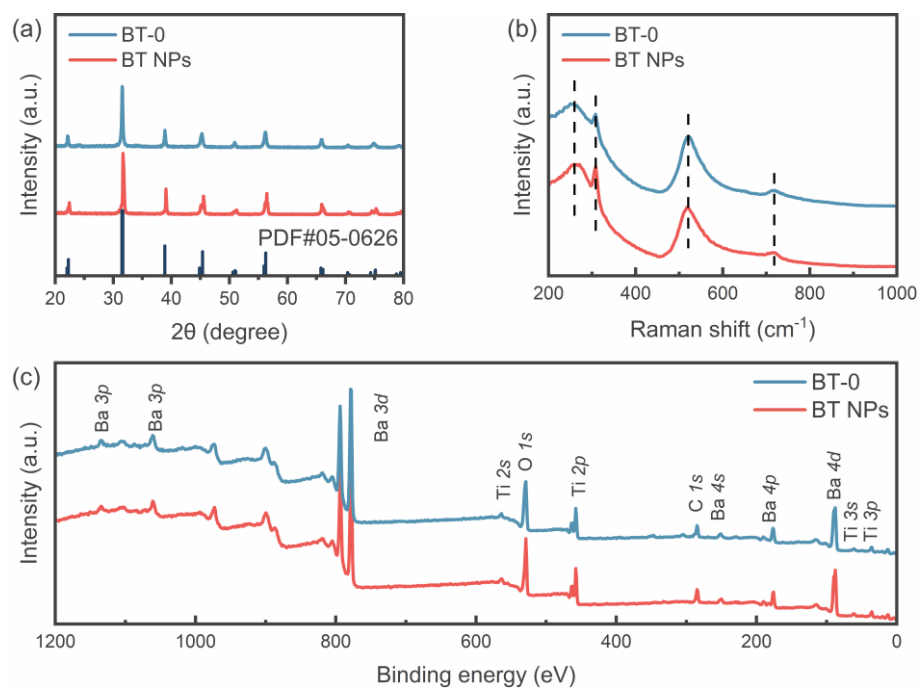
*3 College of Materials Science and Engineering, Xi'an University of Architecture and Technology, Xi'an 710055, China*

\*E-mail addresses of corresponding authors:

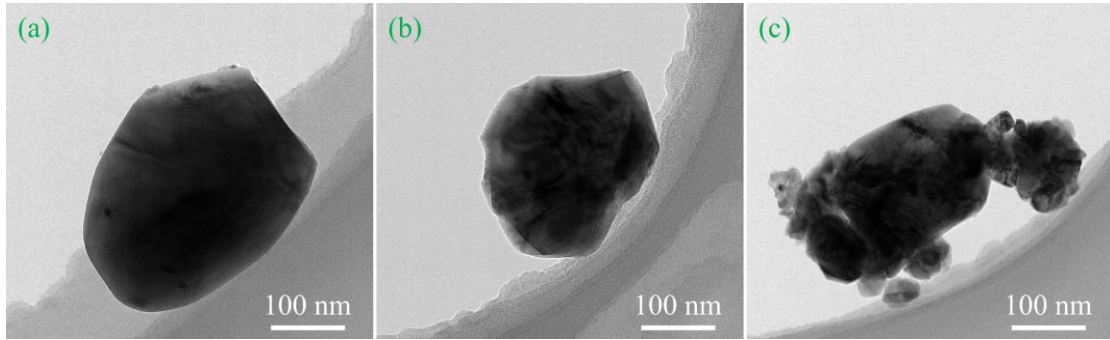
E-mail address: [weijia.wang@nwpu.edu.cn](mailto:weijia.wang@nwpu.edu.cn) (W. Wang).



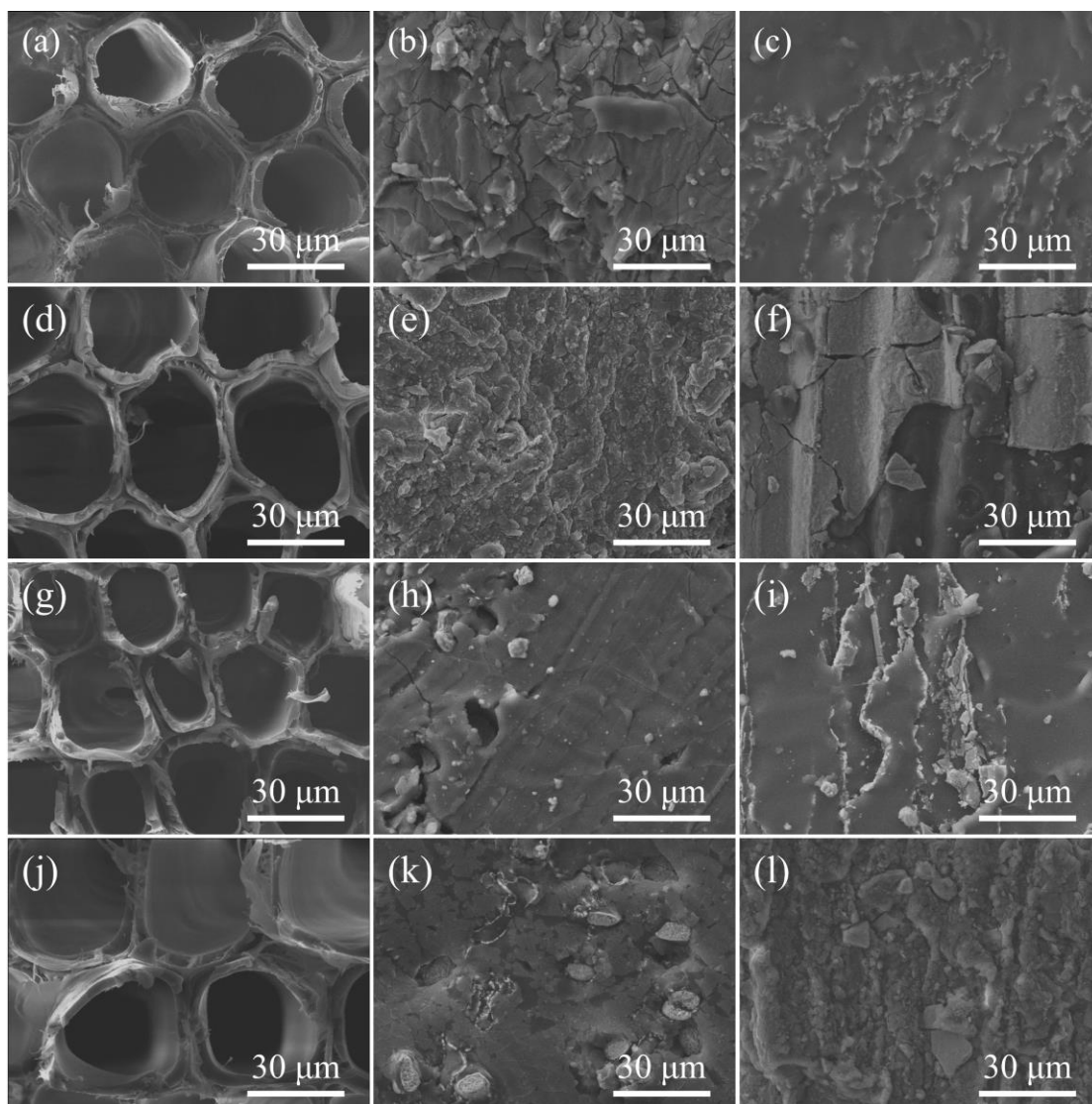
**Fig. S1.** SEM images in the transverse direction of (a) natural pine wood and (b) chemical-treated pine wood, pore size statistics of (c) natural pine wood and (d) natural pine wood.



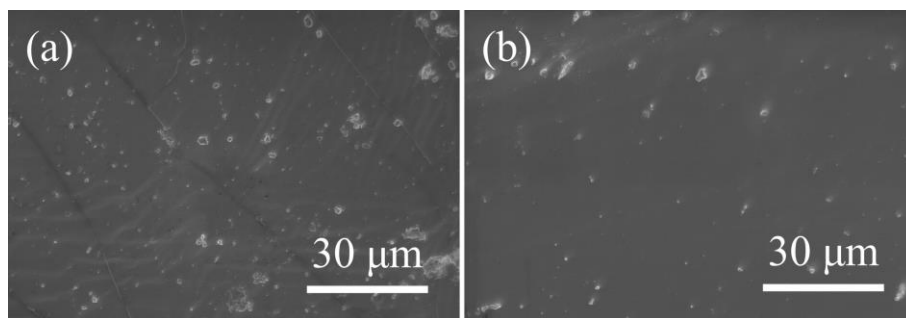
**Fig. S2** (a) XRD patterns, (b) Raman spectra and (c) XPS survey spectra of BT NPs and BT-0.



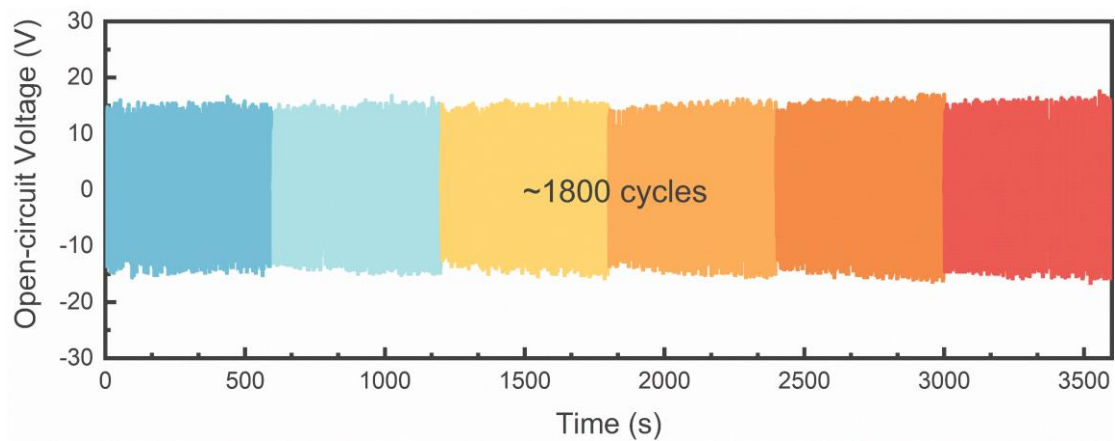
**Fig. S3** TEM images of BT NPs, BT-0 and BT-75.



**Fig. S4** SEM images of precursor in the transverse direction, PDMS/BT- $x$  composite in the transverse direction and PDMS/BT- $x$  composite in the longitudinal direction: (a-c)  $x=0$ , (d-f)  $x=25$ , (g-i)  $x=50$ , (j-l)  $x=100$ .



**Fig. S5** Magnified SEM images of R-PDMS/BT-75 in the (a) transverse and (b) longitudinal direction.



**Fig. S6** The stability and durability test results of PDMS/BT-75 PEH.

**Table S1.** Piezoelectric output performance between this work and other reports constructing PEHs through other methods.

Materials	Preparation	$V_{oc}$ (V)	$I_{sc}$ ( $\mu$ A)	Power density ( $\mu$ W/cm <sup>2</sup> )	References
PDMS/Sm-PMN-PT	freeze-casting	32.5	0.65	2.72	1
PDMS/BT@C	casting	31	1.8	45.4	2
PVDF-TrFE/BTO/PVDF-TrFE	single-crystal spin-coating	15.1	2.39	17.33	3
PDMS/BT	3D printing templating	18	\	17	4
PDMS/PZT	Templating	85	0.04	\	5
PDMS/BCZT	Freeze casting polymer	30.2	13.8	96.2	6
PDMS/BT	template electrospinning	46	14.5	4.89	7
PDMS/BT	Templating	86.6	17.3	39.98	This work



## References

- 1 H. Xu, Y. Hou, X. Yu, X. Gao, M. Zheng and M. Zhu, *J. Mater. Chem. C*, 2022, **10**, 15035-15043.
- 2 Z. Zhou, X. Du, Z. Zhang, J. Luo, S. Niu, D. Shen, Y. Wang, H. Yang, Q. Zhang and S. Dong, *Nano Energy*, 2021, **82**, 105709.
- 3 R. Peng, B. Zhang, G. Dong, Y. Wang, G. Yang, J. Zhang, B. Peng, Y. Zhao and M. Liu, *Adv. Funct. Mater.*, 2024, DOI: 10.1002/adfm.202316519.
- 4 Z. Wang, J. Cheng, Y. Xie, Y. Wang, Z. Yu, S. Li, L. Li, S. Dong and H. Wang, *Adv. Mater. Technol.*, 2022, **7**, 2200650.
- 5 G. Zhang, P. Zhao, X. Zhang, K. Han, T. Zhao, Y. Zhang, C. K. Jeong, S. Jiang, S. Zhang and Q. Wang, *Energy Environ. Sci.*, 2018, **11**, 2046-2056.
- 6 M. Yan, J. Zhong, S. Liu, Z. Xiao, X. Yuan, D. Zhai, K. Zhou, Z. Li, D. Zhang, C. Bowen and Y. Zhang, *Nano Energy*, 2021, **88**, 106278.
- 7 J. Yan, Y. Qin, M. Li, Y. Zhao, W. Kang and G. Yang, *ACS Appl. Mater. Interfaces*, 2022, **14**, 55039-55050.