Electronic Supplementary Material (ESI) for Energy & Environmental Science.

Additional Information

Achieving High Power and Low Crest Factor of Direct-Current Triboelectric Nanogenerator for Self-Powered Optical Computing System

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Additional Figure

Figure A1 | A comparison of the crest factor and average power density of the proposed D-TENG with other DC-TENGs.

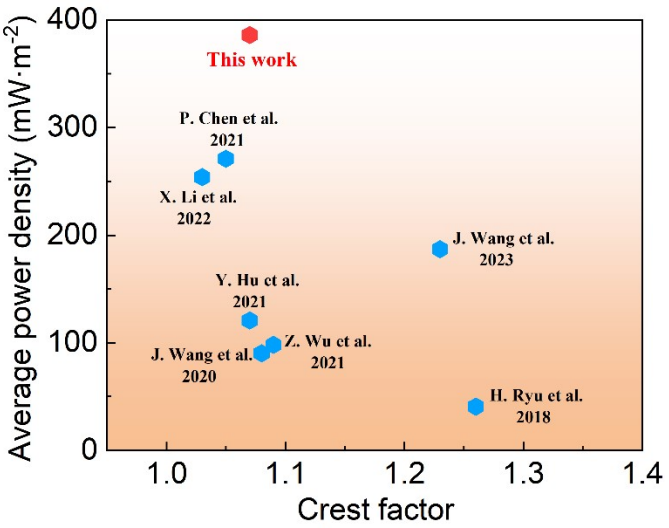
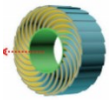
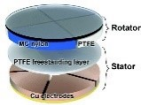
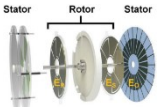
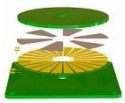
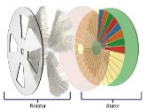
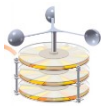
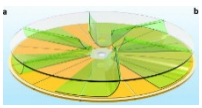
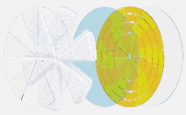


Figure A1 presents the performance comparison of crest factor and average power density among all the presented data in recent reported works about direct-current triboelectric nanogenerators relying on phase shift principle. Among them, **our D-TENG not only shows a very low crest factor that can maintain a constant current output, but also achieves an excellent high-power generation (achieving an increase of 42.4% compared with the work by P. Chen et al. [ref. 7])** as sustainable and stable power source, demonstrating the potential for directly powering electronics and benefiting the future development of the IoTs. Hence, compared with various existing phase shift based DC-TENGs, our work exhibits a unique advantage in DC-TENG performance with ultrahigh and stable output. And the specific parameters of the related works are also listed in the following Table.

Such related works have been supplemented in Supplementary Information, and added the corresponding descriptions in Manuscript.

Additional Table

Table A1. The performance of DC-TENG in this work compared with others based on phase shift design.

Structure	Size	Rotation speed (rpm)	Crest factor	Average power density	Reference
	508.7 cm^3	480	1.31	4.4 ($W \cdot m^{-3}$)	1
	78.5 cm^2	918	1.26	40.6 ($mW \cdot m^{-2}$)	2
	490.86 cm^2	300	1.23	187.02 ($mW \cdot m^{-2}$)	3
	19.6 cm^2	750	1.09	98 ($mW \cdot m^{-2}$)	4
	226.0 cm^2	600	1.08	90.27 ($mW \cdot m^{-2}$)	5
	911.035 cm^2	240	1.07	120.74 ($mW \cdot m^{-2}$)	6
	113.04 cm^2	300	1.05	271 ($mW \cdot m^{-2}$)	7
	1496.23 cm^3	500	1.05	10 ($W \cdot m^{-3}$)	8
	706.5 cm^2	480	1.03	254 ($mW \cdot m^{-2}$)	9
	268.96 cm^2	560	**1.07**	**385.93** ($mW \cdot m^{-2}$)	**This work**

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