

Jing Han

Degree: Ph.D.

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Education Background

Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences Instructor: Qijun Sun

● Doctor of Physics, Major in Condensed Matter Physics 09/2017-06/2022

University of Jinan, China

● Bachelor of Physics 09/2013-06/2017

Research Area

Energy Autonomous Paper Module and Functional Circuits

- **Planar/topological paper-based modules and functional circuits:** The functional circuits of paper-based modules were prepared by laser engraving technology to realize the integration of energy harvesting, storage and application.

Wearable Sensors for Human-Machine interface and Motion Monitoring

- **Energy fiber:** Coaxial fiber combined energy harvesting, supercapacitor and self-driven sensor in one, which makes up for the deficiencies of existing fiber devices such as structure and single function. Realized real-time monitoring of finger movement and human-machine interaction tactile interface.

Graphene-based Carpet for Smart Home System

- Utilization of common carpets as an interactive interface, combined with self-powered sensors for position and activity monitoring. Advanced artificial intelligence (AI) techniques using machine learning (ML) assisted data analysis are applied to the recognition system.

Publications

- **Published 20 SCI papers, including 3 first-author papers and 4 co-author papers**

1. **Han, J.**; Xu, N.; Yu, J.; Wang, Y.; Xiong, Y.; Wei, Y.; Wang, Z. L.; Sun, Q., Energy Autonomous Paper Module and Functional Circuits. *Energy Environ. Sci.* **2022**, 15, 5069. (IF=39.7)

2. **Han, J.**; Xu, C.; Zhang, J.; Xu, N.; Xiong, Y.; Cao, X.; Liang, Y.; Zheng, L.; Sun, J.; Zhai, J.; Sun, Q.; Wang, Z. L., Multifunctional Coaxial Energy Fiber toward Energy Harvesting, Storage, and Utilization. *ACS Nano* **2021**, 15 (1), 1597-1607. (IF=18.0)

3. **Han, J.**; Xu, N.; Liang, Y.; Ding, M.; Zhai, J.; Sun, Q.; Wang, Z. L., Paper-based triboelectric nanogenerators and their applications: a review. *Beilstein J Nanotechnol* **2021**, 12, 151-171. (IF=3.3)

4. Hu, S.; **Han, J.**; Shi, Z.; Chen, K.; Xu, N.; Wang, Y.; Zheng, R.; Tao, Y.; Sun, Q.; Wang, Z. L.; Yang, G., Biodegradable, Super-Strong, and Conductive Cellulose Macrofibers for Fabric-Based Triboelectric Nanogenerator. *Nanomicro Lett* **2022**, *14* (1), 115. (IF=23.6) (co-author)
5. Luo, L.; **Han, J.**; Xiong, Y.; Huo, Z.; Dan, X.; Yu, J.; Yang, J.; Li, L.; Sun, J.; Xie, X.; Wang, Z. L.; Sun, Q., Kirigami interactive triboelectric mechanologic. *Nano Energy* **2022**, *99*, 107345. (IF=19.0) (co-author)
6. Ho, D. H.; **Han, J.**; Huang, J.; Choi, Y. Y.; Cheon, S.; Sun, J.; Lei, Y.; Park, G. S.; Wang, Z. L.; Sun, Q.; Cho, J. H., β -Phase-Preferential blow-spun fabrics for wearable triboelectric nanogenerators and textile interactive interface. *Nano Energy* **2020**, *77*, 105262. (IF=19.0) (co-author)
7. Yang, X.; **Han, J.**; Yu, J.; Chen, Y.; Zhang, H.; Ding, M.; Jia, C.; Sun, J.; Sun, Q.; Wang, Z. L., Versatile Triboiontronic Transistor via Proton Conductor. *ACS Nano* **2020**, *14* (7), 8668-8677. (IF=18.0) (co-author)
8. Yang, J.; Cao, J.; Han, J.; Xiong, Y.; Luo, L.; Dan, X.; Yang, Y.; Li, L.; Sun, J.; Sun, Q., Stretchable multifunctional self-powered systems with Cu-EGaIn liquid metal electrodes. *Nano Energy* **2022**, *101*. (IF=19.0)
9. Xu, N.; Han, J.; Xiong, Y.; Wang, Z. L.; Sun, Q., TENG Applications in Transportation and Surrounding Emergency Management. *Adv. Sustainable Syst.* **2022**, *6* (10). (IF=6.7)
10. Xiong, Y.; Han, J.; Wang, Y.; Wang, Z. L.; Sun, Q., Emerging Iontronic Sensing: Materials, Mechanisms, and Applications. *Research* **2022**, *2022*, 1-35. (IF=11)
11. Zhang, J.; Hu, S.; Shi, Z.; Wang, Y.; Lei, Y.; Han, J.; Xiong, Y.; Sun, J.; Zheng, L.; Sun, Q.; Yang, G.; Wang, Z. L., Eco-friendly and recyclable all cellulose triboelectric nanogenerator and self-powered interactive interface. *Nano Energy* **2021**, *89*. (IF=19.0)
12. Yu, J.; Yang, X.; Gao, G.; Xiong, Y.; Wang, Y.; Han, J.; Chen, Y.; Zhang, H.; Sun, Q.; Wang, Z. L., Bioinspired mechano-photonic artificial synapse based on graphene/MoS₂ heterostructure. *Sci Adv* **2021**, *7* (12). (IF=14.9)
13. Yu, J.; Gao, G.; Huang, J.; Yang, X.; Han, J.; Zhang, H.; Chen, Y.; Zhao, C.; Sun, Q.; Wang, Z. L., Contact-electrification-activated artificial afferents at femtojoule energy. *Nat Commun* **2021**, *12* (1), 1581. (IF=17.6)
14. Sun, Q.-J.; Lei, Y.; Zhao, X.-H.; Han, J.; Cao, R.; Zhang, J.; Wu, W.; Heidari, H.; Li, W.-J.; Sun, Q.; Roy, V. A. L., Scalable fabrication of hierarchically structured graphite/polydimethylsiloxane composite films for large-area triboelectric nanogenerators and self-powered tactile sensing. *Nano Energy* **2021**, *80*. (IF=19.0)
15. Yang, Y.; Han, J.; Huang, J.; Sun, J.; Wang, Z. L.; Seo, S.; Sun, Q., Stretchable Energy-Harvesting Tactile Interactive Interface with Liquid-Metal-Nanoparticle-Based Electrodes. *Adv. Funct. Mater.* **2020**, *30* (29), 1909652. (IF=19.9)
16. Huang, J. R.; Yang, X. X.; Yu, J. R.; Han, J.; Jia, C. K.; Ding, M.; Sun, J.; Cao, X. L.; Sun, Q. J.; Wang, Z. L., A universal and arbitrary tactile interactive system based on self-powered optical communication. *Nano Energy* **2020**, *69*, 104419. (IF=19.0)

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推荐信息：

Recommended by Dr. Qijun Sun, Beijing Institute of Nanoenergy and Nanosystems,
Chinese Academy of Sciences, Professor, sunqijun@binn.cas.cn

The candidate's research focuses on self-powered systems and proposed a prototype of energy autonomous paper modules and functional circuits. The proposed energy-autonomous functional paper modules present new paradigm for sustainable and adaptive functional circuits to extend the broader path toward efficient, economical, and customized integrative electronics and complementary self-powered systems. The candidate's research area meets the requirements of the Young Leaders Conference Forum for young leaders.