Ecoflex flexible array of triboelectric nanogenerators for gait monitoring alarm warning applications

Qinglan Zheng [1], Changjun Jia [1], Fengxin Sun [1], Mengqi Zhang [1], Yuzhang Wen [1], Zhenning Xie [1], Junxiao Wang [2], Bing Liu [3,*], Yupeng Mao [1,2,*] and Chongle Zhao [1,*]

[1] Physical Education Department, Northeastern University, Shenyang 110819, China; 2271515@stu.neu.edu.cn (Q.Z.); 2071367@stu.neu.edu.cn (C.J.); 2171435@stu.neu.edu.cn (F.S.); 2201367@stu.neu.edu.cn (M.Z.); 2201361@stu.neu.edu.cn (Y.W.); 2201362@stu.neu.edu.cn (Z.X.); m15753191782@163.com (J.W.)

[2] School of Strength and Conditioning Training, Beijing Sport University, Beijing 100084, China

[3] Shenyang Sport University, Shenyang 110102, China

[*] Correspondence: bingliu067@163.com (B.L.); maoyupeng@pe.neu.edu.cn (Y.M.); zhaochongle@pe.neu.edu.cn (C.Z.)

Table S1. Comparison between FWF -TENG response and fast response of other TENG;

Figure S1. Measurement equipment;

Figure S2. Optical picture of the FWF-TENG array form located in the insole;

Figure S3. Demonstrates the full form of the WPIS;

Figure S4. Optical picture of FWF-TENG's wireless transmission system.

Video S1. Demonstration of the gas support structure of the FWF-TENG;

Video S2. FWF-TENG lights LEDs;

Video S3. LEDs on each part of the foot are accurately lit by the sensor;

Video S4. Badminton gait wireless judgment;

Video S5. Real-time fall alarm.

Table S1. Comparison between FWF -TENG response and fast response of other TENG.

Article name	Material	Mchanism	Fast response time
Detection of driving actions on steering wheel using triboelectric nanogenerator via machine learning	Kapton, Aluminum, buffer layer	Vertical detached mode	608ms
Nano-fiber based self-powered flexible vibration sensor for rail fasteners tightness safety detectionNano-fiber based self-powered flexible vibration sensor for rail fasteners tightness safety detection Nanohybrid Ammonia Sensor	PVDF/BTO nanofibers as negative triboelectric layer, silicone rubber as positive triboelectric layer, and aluminum (Al) electrode.	Vertical detached mode	40ms
Strong and flame-retardant wood-based triboelectric nanogenerators toward self-powered building fire protection	Polyvinyl alcohol/silver (PVA/Ag) nanofibers and ethylene propylene fluoride (FEP) films.	Vertical detached mode	50ms
High-performance flexible self-powered tin disulfide nanoflowers/reduced graphene oxide nanohybrid-based humidity sensor driven by triboelectric nanogenerator	Strong and flame-retardant wood is dielectric, and negative friction charge is generated on PTFE film, while positive friction charge is generated on wood film.	Single electrode	50ms
A smart triboelectric nanogenerator with tunable rheological and electrical performance for self-powered multi-sensors	SSR, Copper foil, metal wire	Single electrode	43ms
	Ecoflex, Cu, enamelled wire	Single electrode	28ms

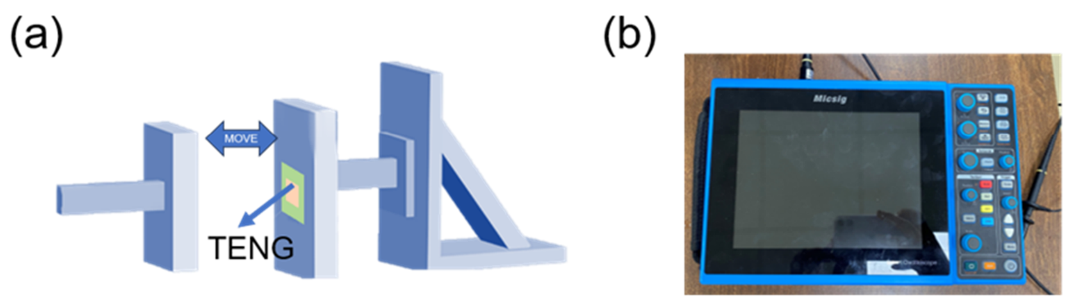

Figure S1. Measurement equipment. (a) The working diagram of FWF-TENG simulated by a stepper motor. (b) Oscillograph.

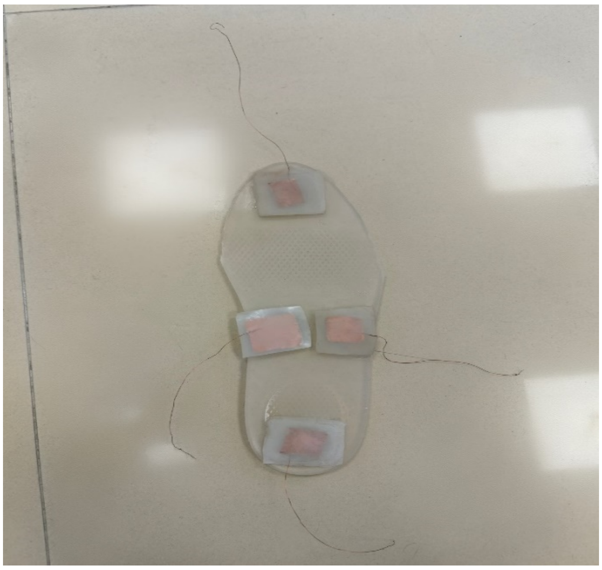

Figure S2. Optical picture of the FWF-TENG array form located in the insole.

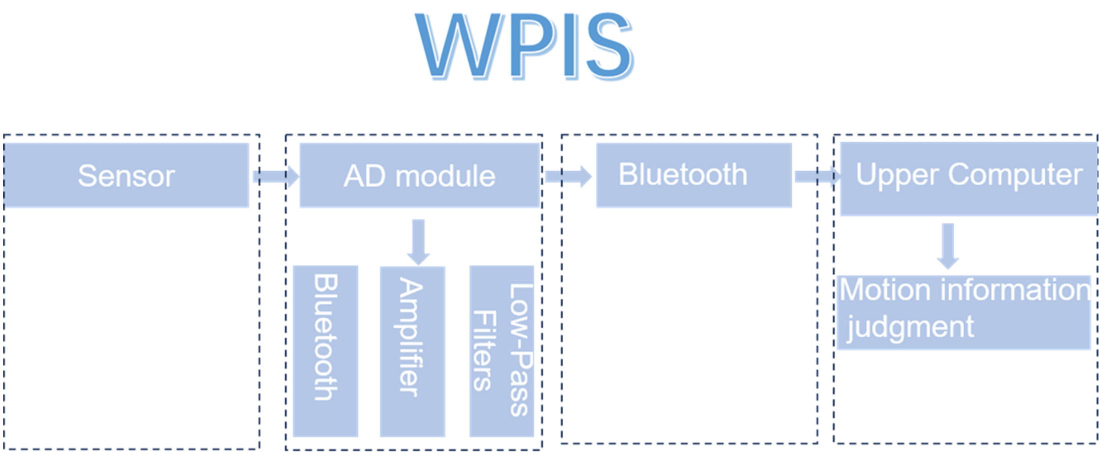

Figure S3. Demonstrates the full form of the WPIS.

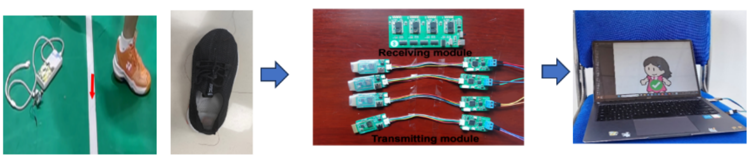

Figure S4. Optical picture of FWF-TENG's wireless transmission system.