Supplementary information

Strong, biodegradable, and recyclable all-lignocellulose fabricated triboelectric nanogenerator for self-powered disposable medical monitoring

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Supplementary figures

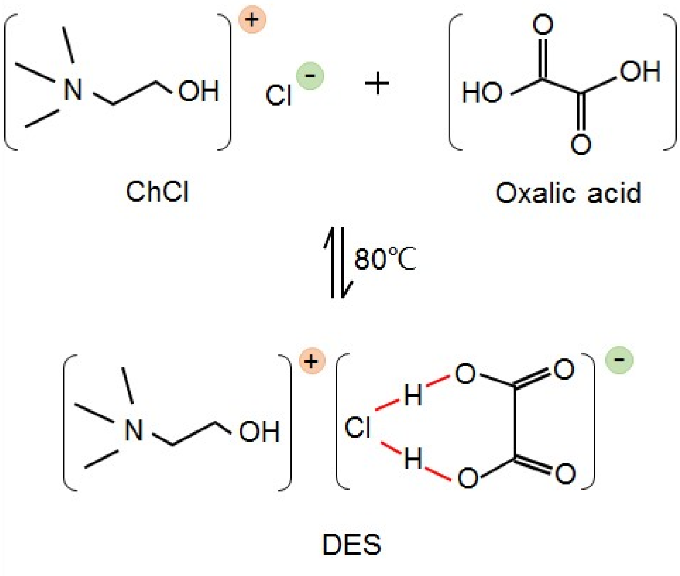

Fig. S1 The preparation process of the DES consists of ChCl and oxalic acid.

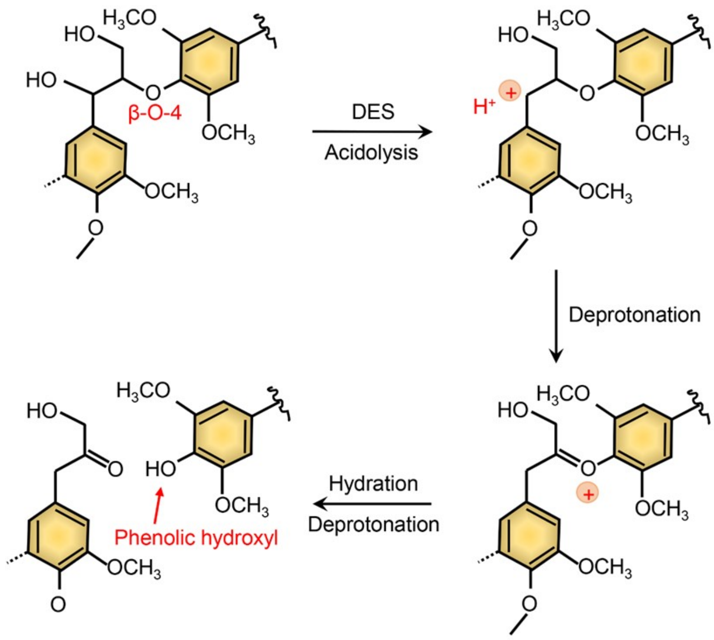

Fig. S2 Schematic diagram showing the mechanism of the lignin decomposition during DES treatment.

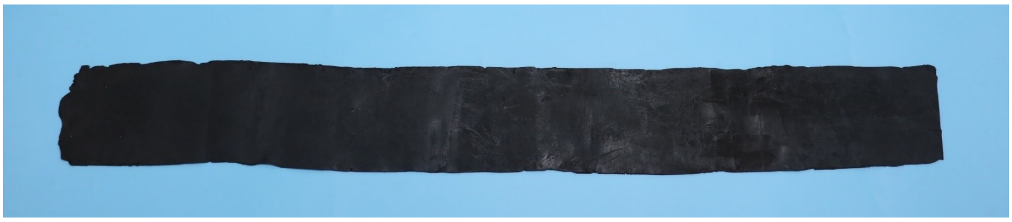

Fig. S3 A large-scale sheet of the LB ($115 \times 15 \times 0.15$ cm^3).

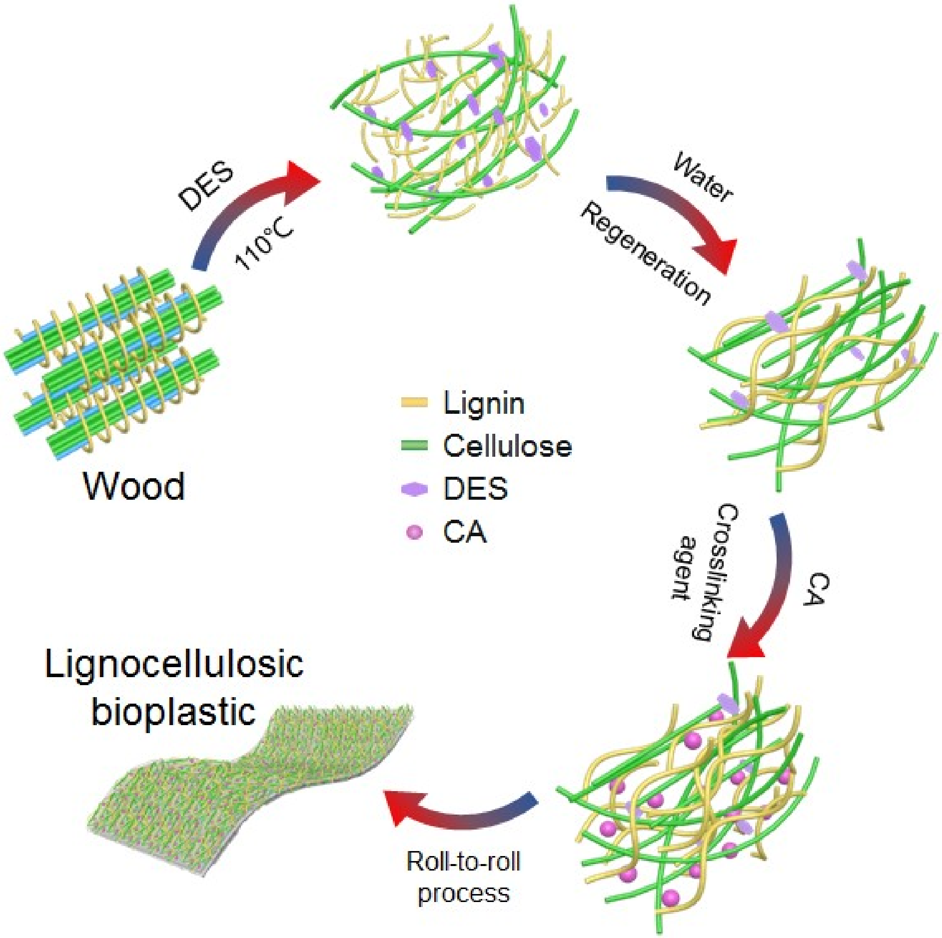

Fig. S4 The fabrication mechanism of the LB.

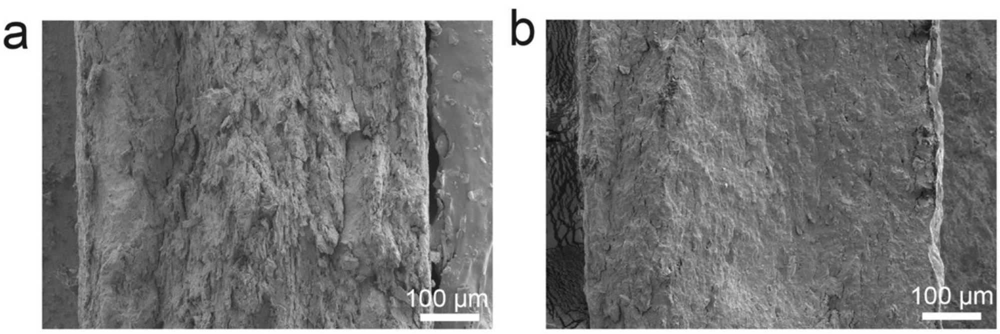

Fig. S5 Cross-sectional-view SEM images of the (a) UC-LB and (b) LB.

Fig. S6 Biodegradability test of the LB, UC-LB, and PTFE on the soil surface for three months.

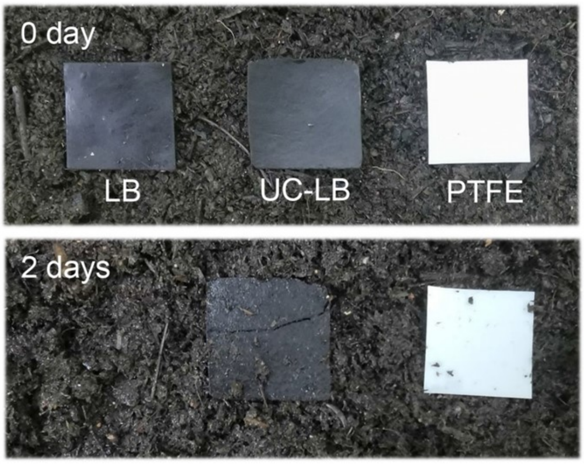

Fig. S7 Biodegradability test of the LB, UC-LB, and PTFE in soil ($2 \times 2 \times 0.05$ cm^3).

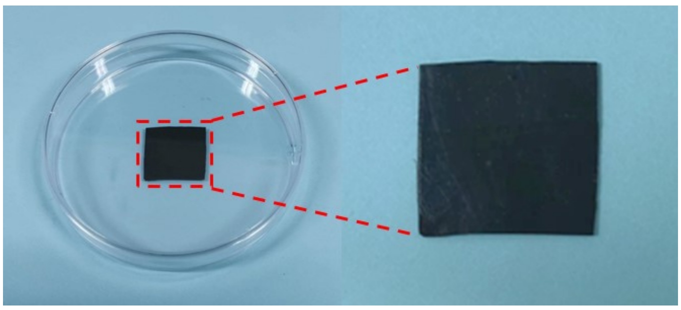

Fig. S8 Photograph of the LB stored in real conditions after more than ten months (2

× 2 × 0.05 cm³).

Fig. S9 The universality of the LB preparation method. The LB can be made from various biomass feedstocks, including wood, wheat straw, rice straw, corn straw, bagasse, and bamboo, demonstrating the strong universality of this approach (2 × 2 × 0.05 cm^3).

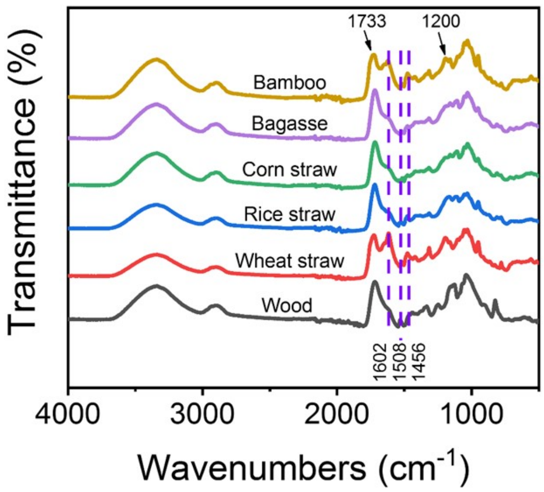

Fig. S10 FTIR spectra of the LB prepared from different kinds of plants.

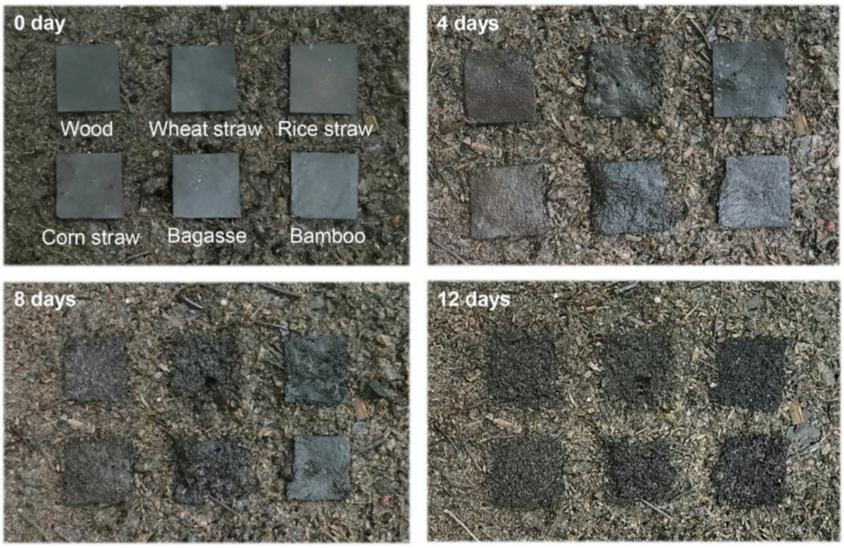

Fig. S11 Biodegradability test of the LBs derived from various biomass feedstocks.

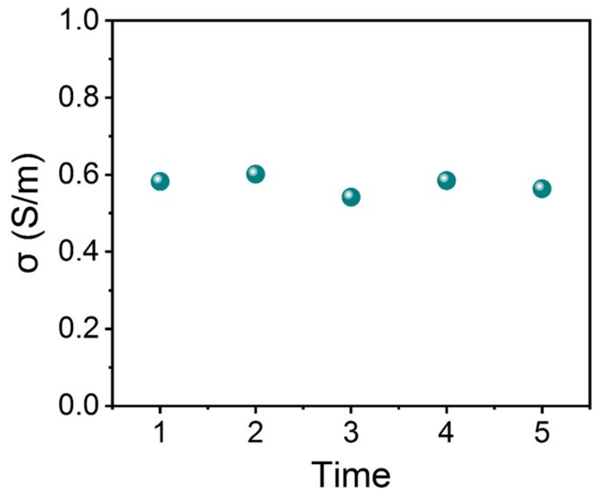

Fig. S12 The conductivity of the recycled C-LB.

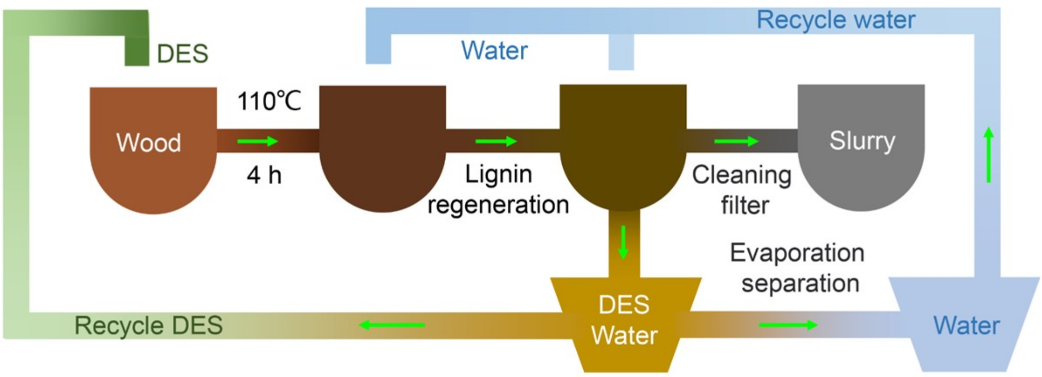

Fig. S13 Flow diagram for continuous in situ lignin regeneration treatment and the recycling of the DES.

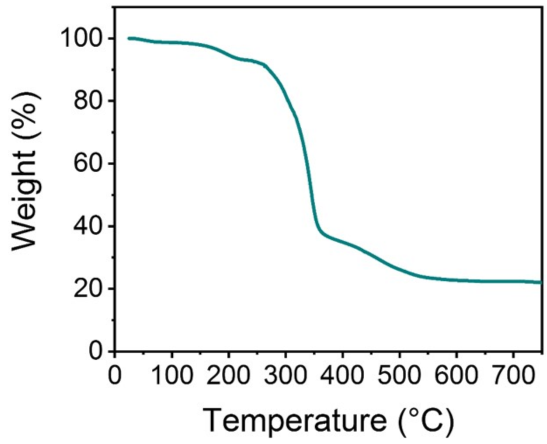

Fig. S14 TGA curve of the LB under the air atmosphere.

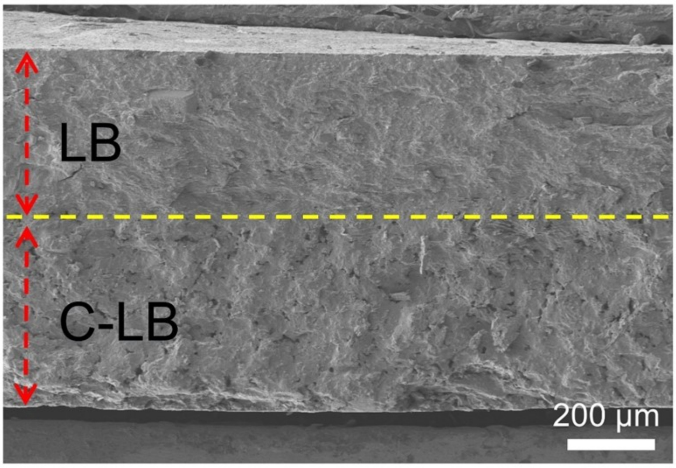

Fig. S15 Cross-sectional-view SEM image of the AL-TENG.

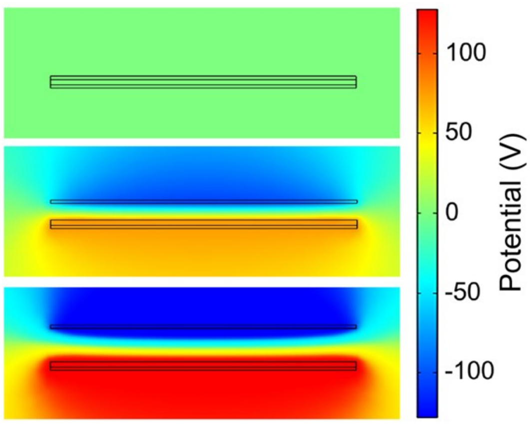

Fig. S16 Potential simulation by COMSOL to elucidate the working principle of the AL-TENG.

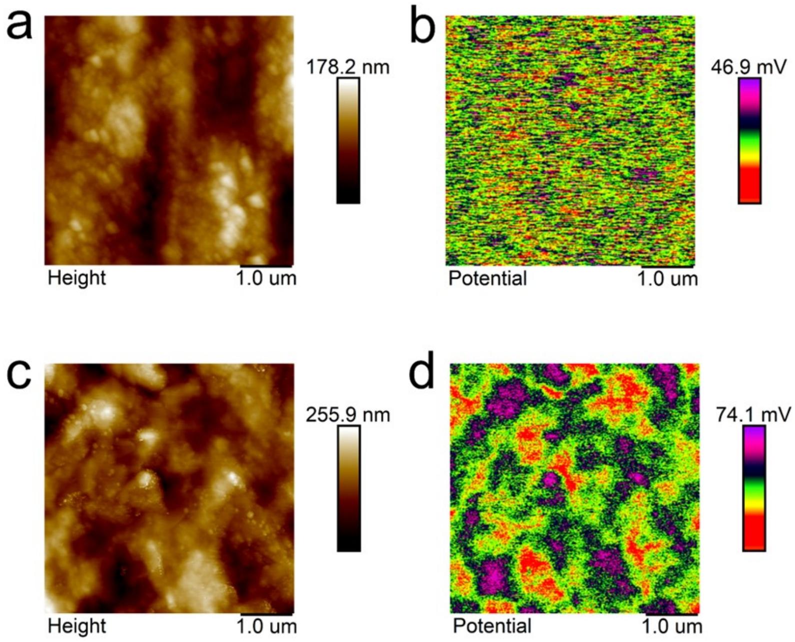

Fig. S17 The surface morphology and surface potential of LB before (a, b) and after (c, d) contact electrification.

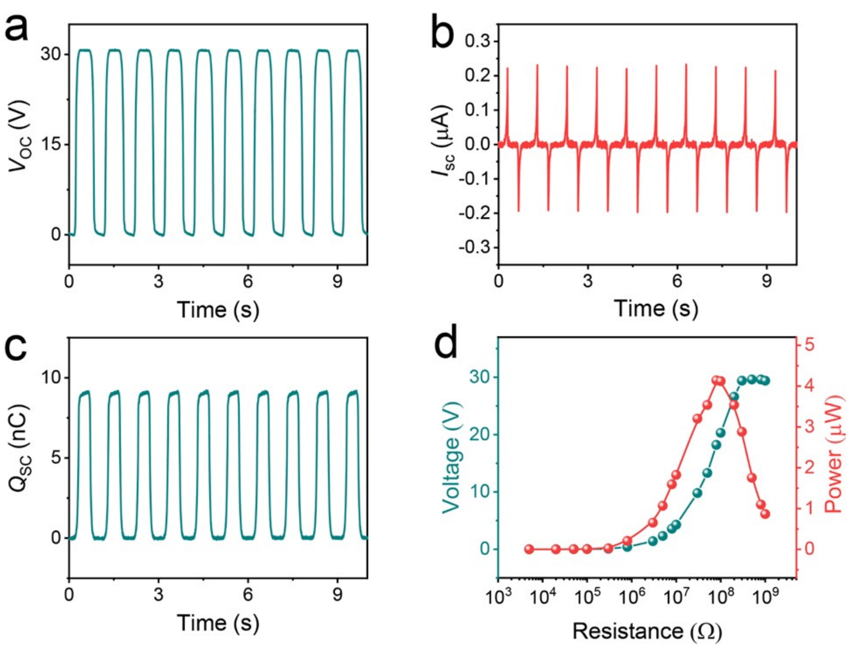

Fig. S18 The electrical output performance of the AL-TENG: (a) V_{OC}, (b) I_{SC}, (c) Q_{SC}, and (d) Dependence of the output voltage and peak power of the AL-TENG.

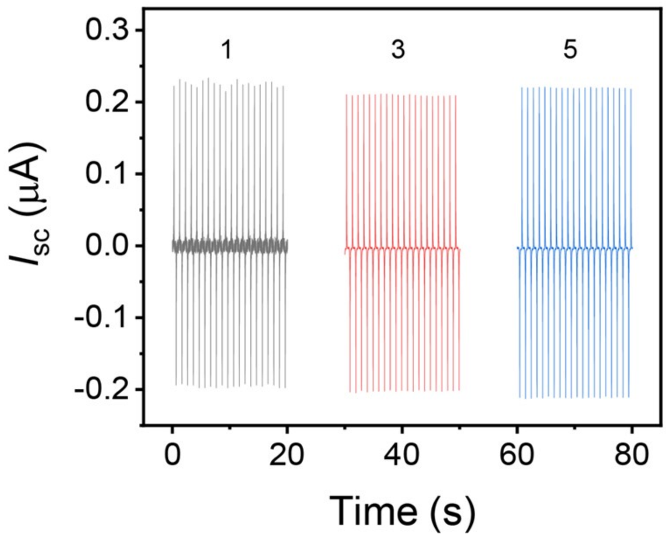

Fig. S19 The I_{SC} of the AL-TENG was recycled and reprocessed.

Fig. S20 Q_{SC} of the AL-TENG prepared from different kinds of plants.

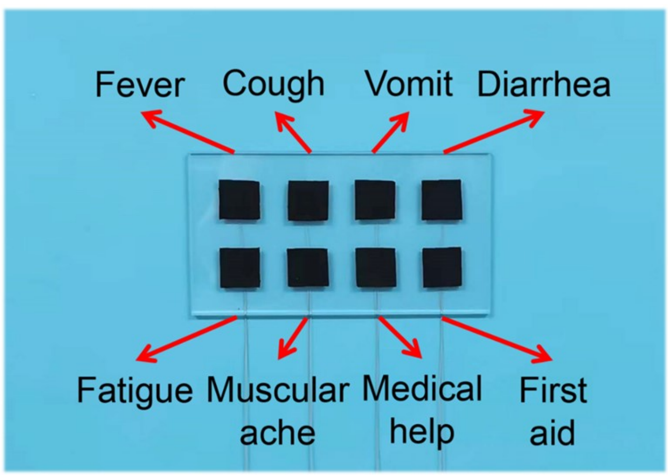

Fig. S21 Photograph of the AL-TENG sensing array.

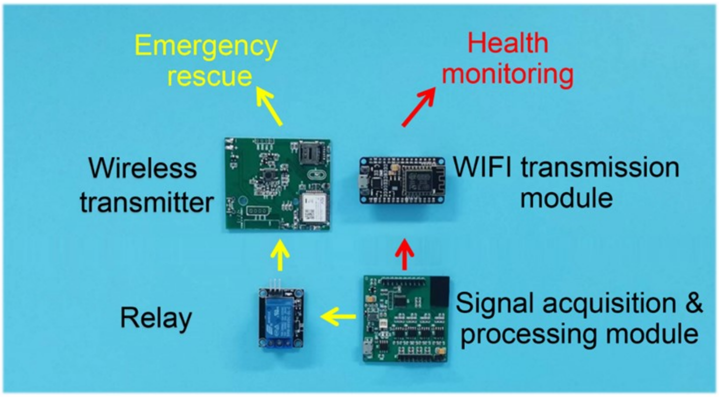

Fig. S22 Photograph of the signal control circuit boards.

Table S1. Tensile strength, thermal degradation temperature, and degradation cycle of LB, cellulose film, PLA, and PS.

Materials	Tensile strength (MPa)	Thermal degradation temperature (℃)	Degradation cycle
LB	99	327	12 day
Cellulose film[1,2]	12	270	Several months
PLA[3-6]	10.7-69.1	310	About one month
PS[7-9]	25	223	Refractory to degradation

Supplementary references

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Supplementary movies

Movie S1: Self-powered smart ward system.

Movie S2: Self-powered contactless medical monitoring system.