

Supplementary Materials

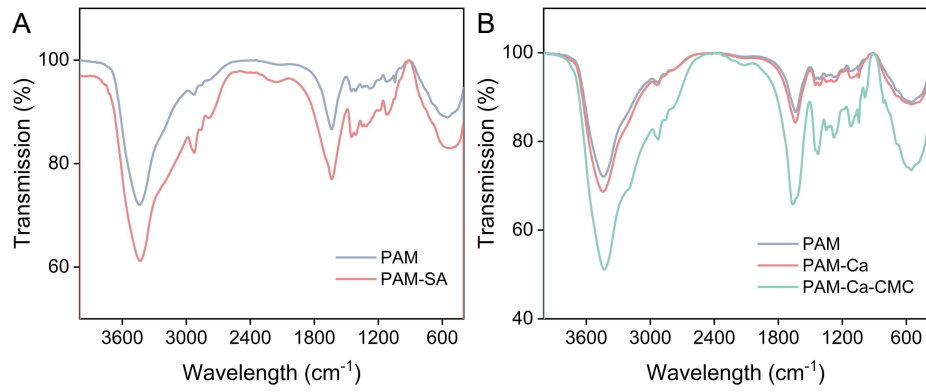
An autonomous regenerative bioelectronic dressing powered by wound exudate for high-quality skin repair

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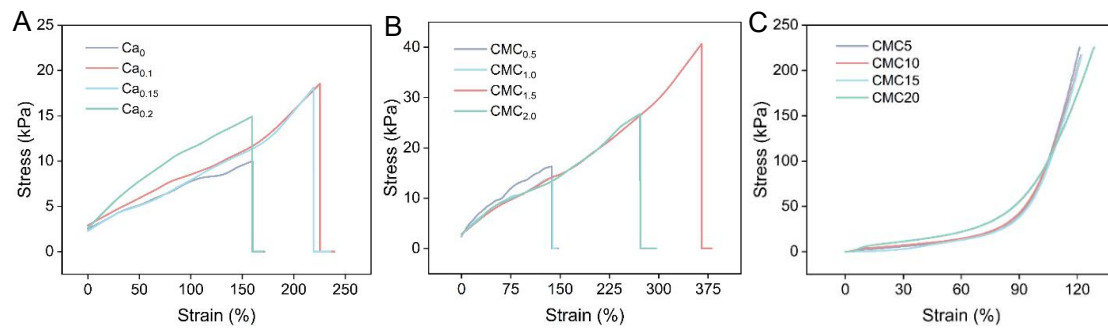
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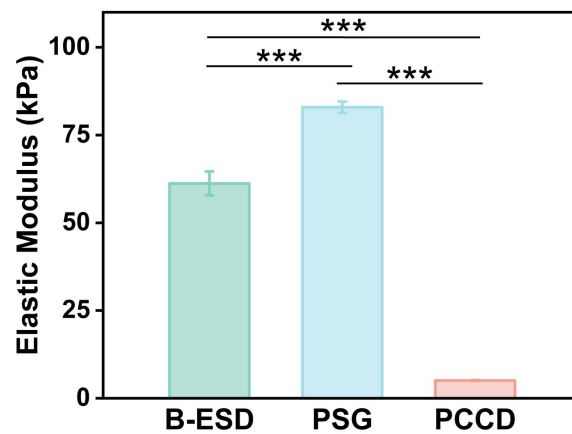
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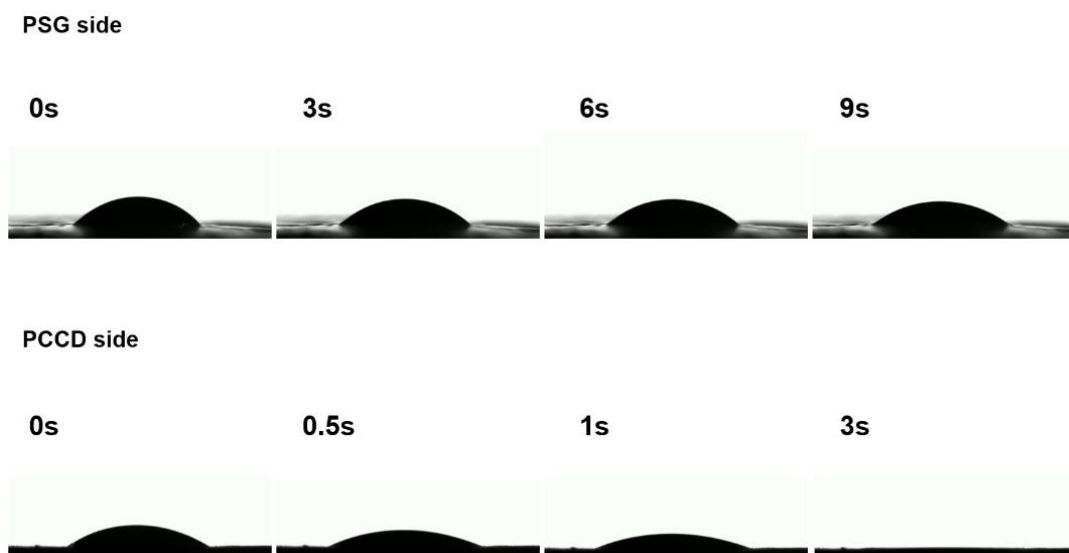
Supplementary Figure 1. Fourier transform infrared (FTIR) analysis of (A) PSG and (B) PCCD.



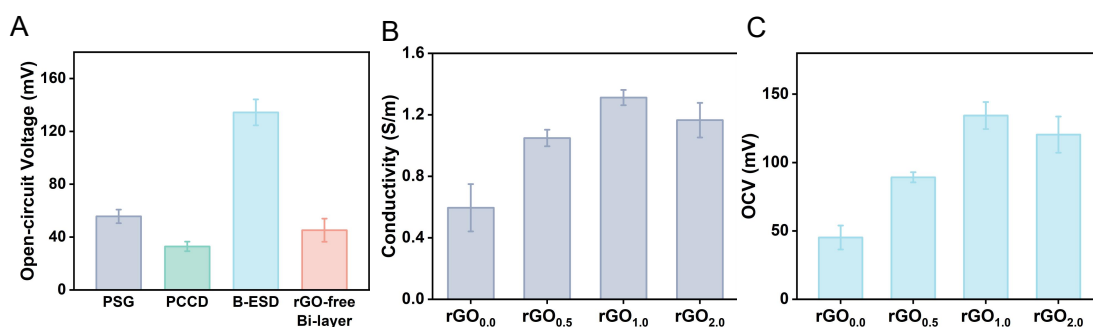
Supplementary Figure 2. Tensile stress-strain curves of B-ESD at different (A) Ca^{2+} and (B) CMC concentrations. (C) Compression stress-strain curve of B-ESD at different CMC concentrations.



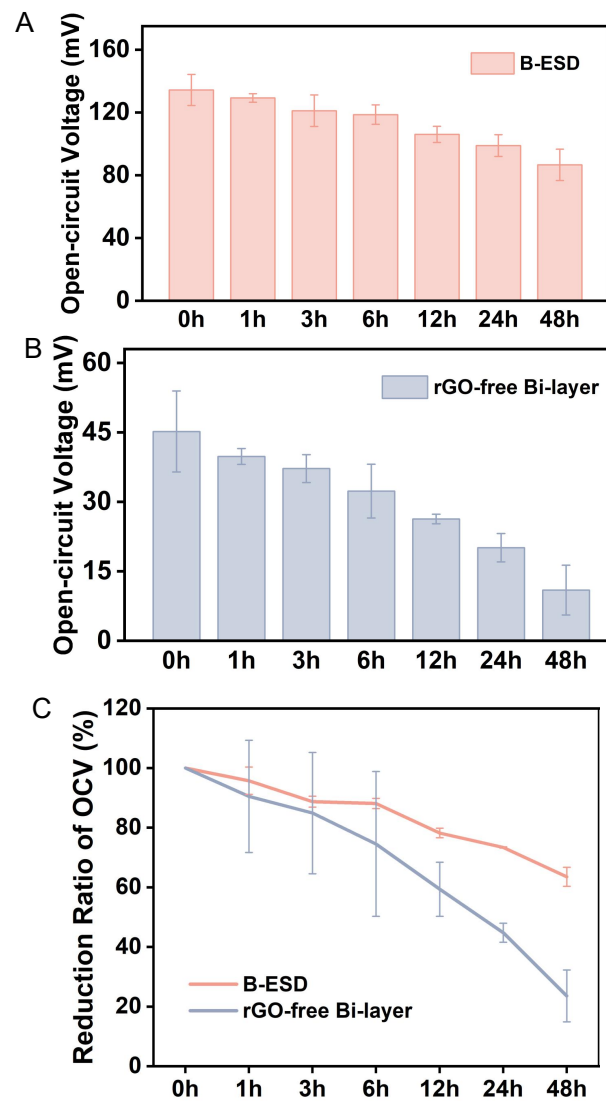
Supplementary Figure 3. Elastic modulus of B-ESD, PSG and PCCD (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$).



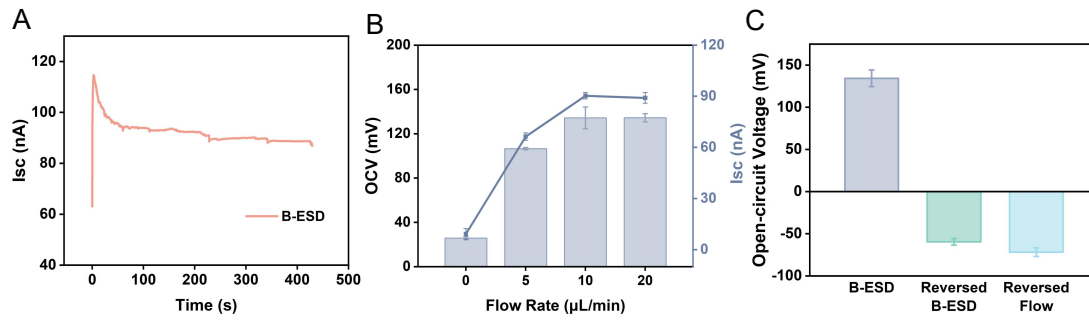
Supplementary Figure 4. Dynamic process of water droplets on PSG and PCCD sides.



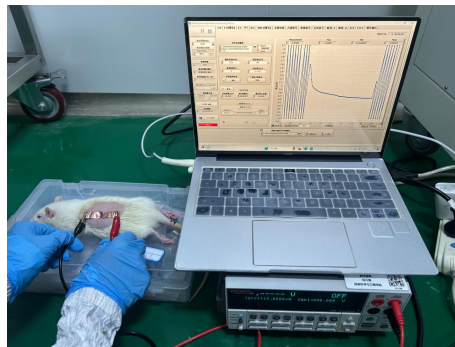
Supplementary Figure 5. *Ex vivo* electrogenerative output of the hydrogels in simulated wound exudate. (A) Open-circuit voltage (OCV) of PSG, PCCD, B-ESD and the rGO-free bilayer. (B) Electrical conductivity and (C) OCV of the B-ESD prepared with different rGO contents (0, 0.5, 1.0 and 2.0 wt% relative to AM). Data are expressed as mean $\pm$ SD ($n = 3$).



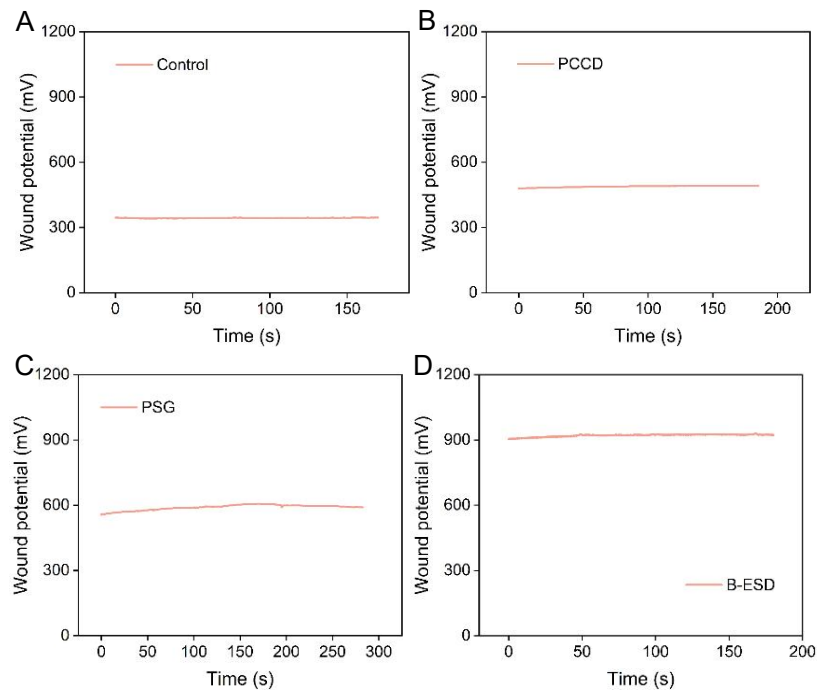
Supplementary Figure 6. Long-term output stability over 48 h under continuous perfusion of simulated wound exudate. (A) OCV of the B-ESD and (B) the rGO-free bilayer recorded at 0, 1, 3, 6, 12, 24 and 48 h. (C) Normalized OCV retention of the B-ESD and the rGO-free bilayer. Data are expressed as mean $\pm$ SD ($n = 3$).



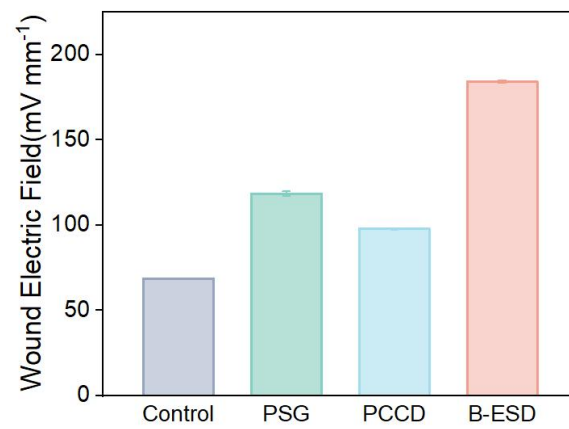
Supplementary Figure 7. Streaming-potential output of the B-ESD under controlled fluid flow. (A) Short-circuit current (Isc) under continuous perfusion of simulated wound exudate. (B) Flow-rate dependence of the OCV and Isc. (C) OCV recorded with the device in reversed orientation (Reversed B-ESD) and with reversed flow direction (Reversed Flow). Data are expressed as mean $\pm$ SD ($n = 3$).



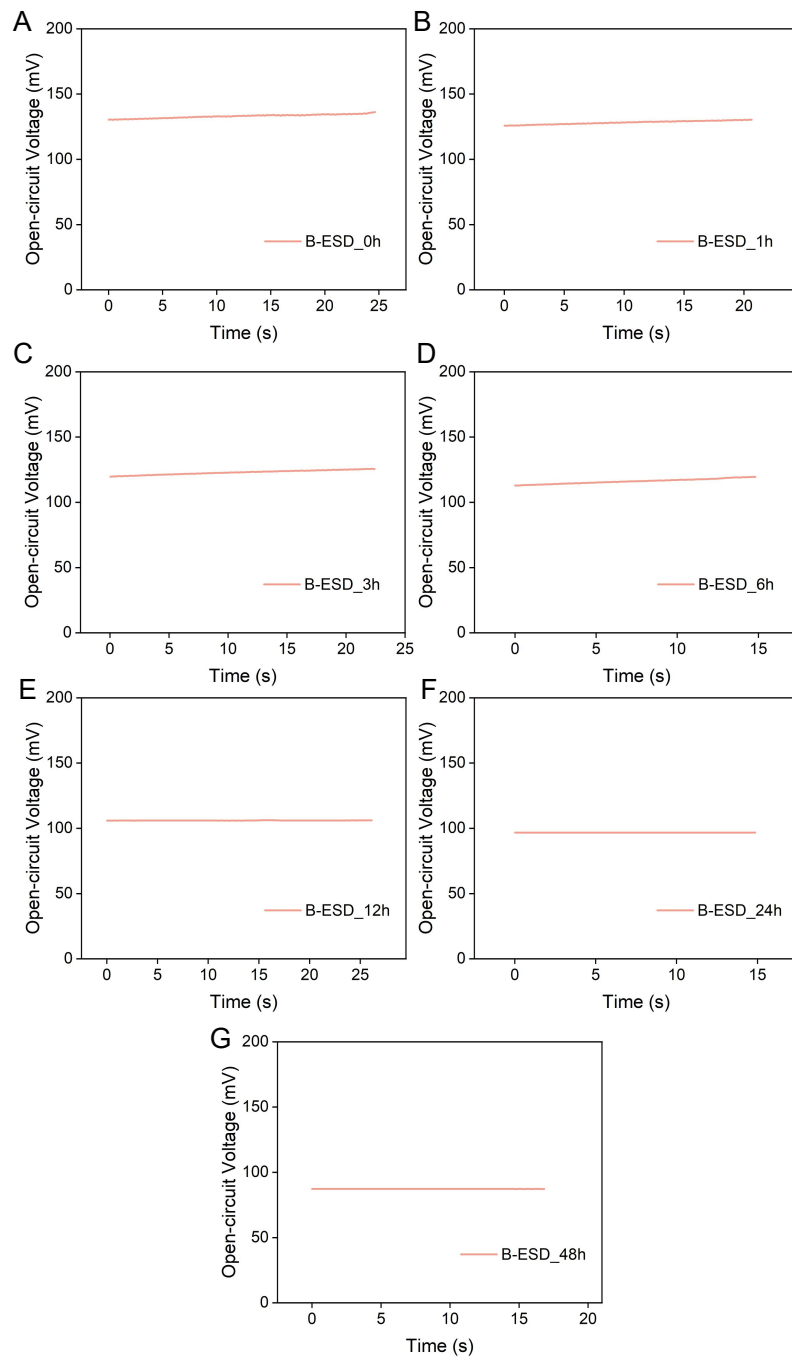
Supplementary Figure 8. In situ measurements of the potential difference between the wound center and the epidermis at the wound edge of a SD rat. Photographs taken by the authors.



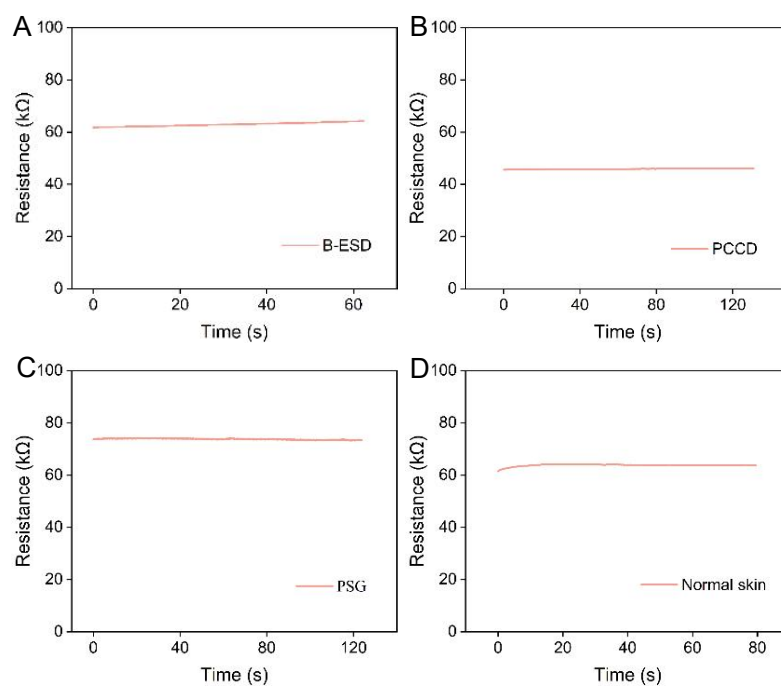
Supplementary Figure 9. Wound potential tested under different treatments.



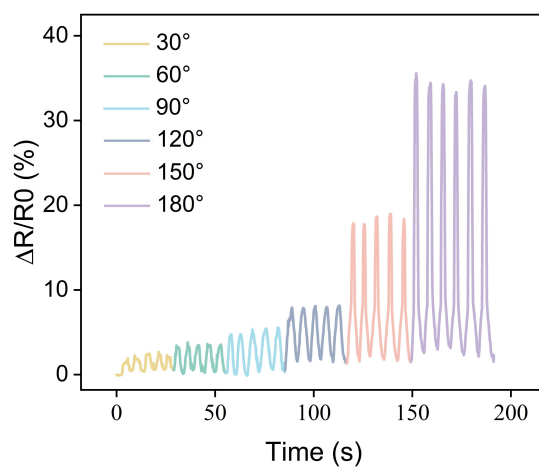
Supplementary Figure 10. Wound electric field measured under different treatments.



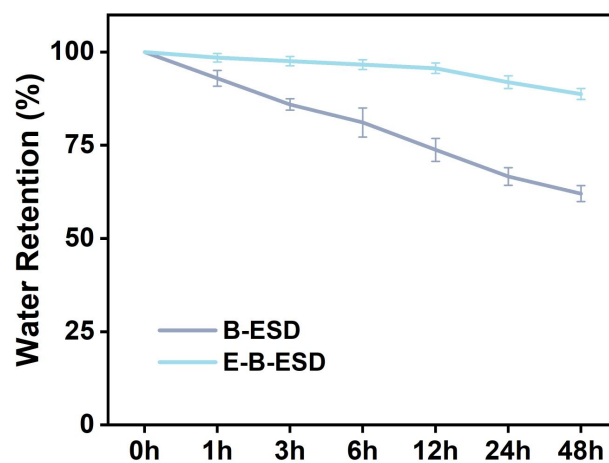
Supplementary Figure 11. Representative real-time OCV traces of the B-ESD recorded at (A) 0, (B) 1, (C) 3, (D) 6, (E) 12, (F) 24 and (G) 48 h under continuous perfusion of simulated wound exudate.



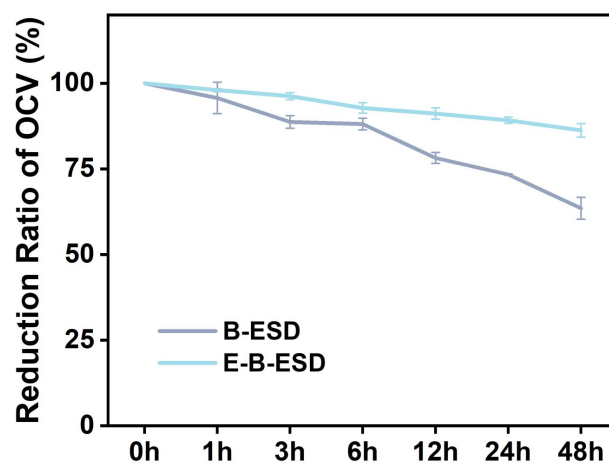
Supplementary Figure 12. Wound resistance tested under different treatments: (A) B-ESD, (B) PCCD, (C) PSG and (D) normal skin.



Supplementary Figure 13. Relative resistance changes ($\Delta R/R_0$) of B-ESD under different bending angles



Supplementary Figure 14. Water retention of the B-ESD with (E-B-ESD) and without encapsulation over 48 h at 32 °C. Data are expressed as mean $\pm$ SD ($n = 3$).



Supplementary Figure 15. Normalized OCV retention of the B-ESD with (E-B-ESD) and without encapsulation over 48 h. Data are expressed as mean $\pm$ SD ($n = 3$).