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# Appendix

## A soft intelligent dressing with pH and temperature sensors for early detection of wound infection

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**Table S1.** Comparison of flexible materials used in wound monitoring

| **Material** | **Thickness/μm** | **Elastic modulus/N/mm$^2$** | **Poisson's ratio** | **Reference** |
|---|---|---|---|---|
| PET | 120 | 4000 | 0.394 | [1] |
| bandage | no shown | no shown | no shown | [2] |
| PI | 100* | 3000 | 0.34 | [3] |
| PDMS | no shown | no shown | no shown | [4] |
| **SEBS** | **200** | **0.1** | **0.3** | **This work** |

* by scale

**Table S2.** Comparison of flexible pH sensor used in wound monitoring

| **Materials** | **Sensitivity** | **$R^2$** | **reference** |
|---|---|---|---|
| PANI | -50mv/pH | 0.95 | [5] |
| PANI | -60.34 mv/pH | 0.999 | [3] |
| PANI | -57.037 mv/pH | 0.998 | [4] |
| PANI | -50 mv/pH | 0.973 | [6] |
| PANI | -65.9 mv/pH | 0.998 | This work |

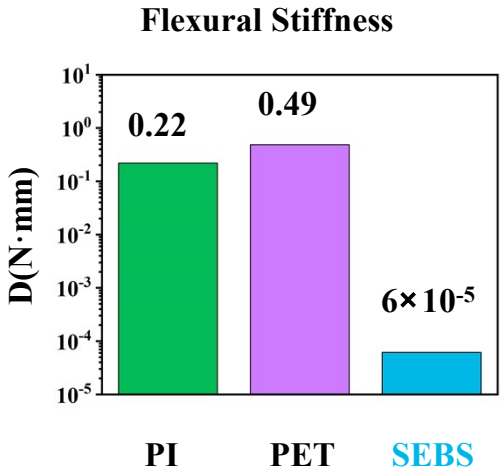


**Fig. S1.** Flexural stiffness of different materials applied to wound monitoring.

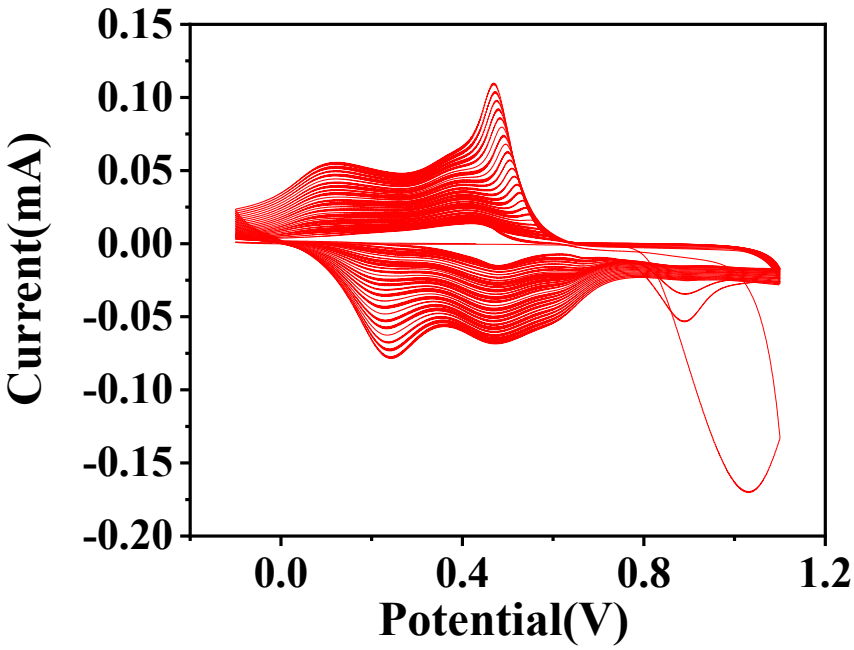


**Fig. S2.** Cyclic voltammetry of electrodeposited polyaniline (Voltage range is -0.5-1.1v, scanning rate is 50mv/s, Number of scanning turns is 25, Electrode area is 2×2mm).

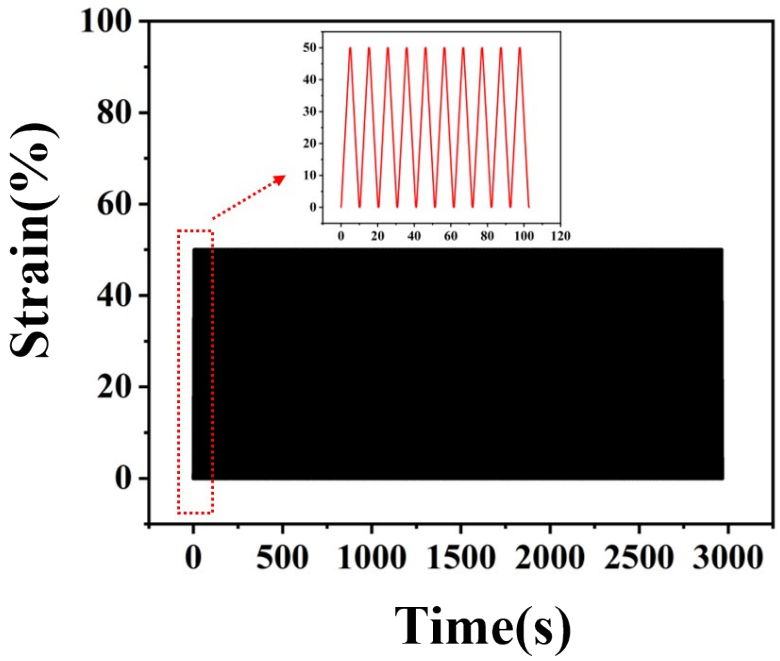


**Fig. S3.** pH sensor 50% tensile cycle 300 times.

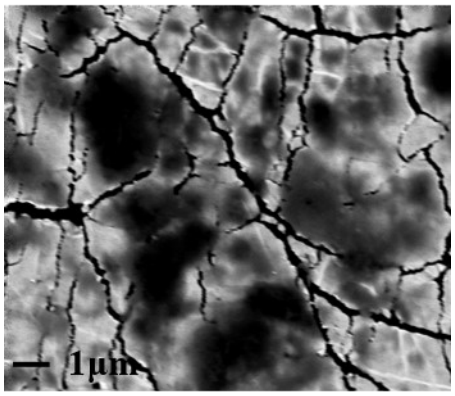


**Fig. S4.** SEM image of pH sensor after stretching

**Reference**


[1] Rahimi, R., Brener, U., Chittiboyina, S., Soleimani, T., Detwiler, D.A., Lelièvre, S.A., Ziaie, B., Sens. and Actuators B Chem., 2018, 267, 198-207.

[2] Kassal, P., Kim, J., Kumar, R., de Araujo, W.R., Steinberg, I.M., Steinberg, M.D., Wang, J., Electrochem. commun., 2015, 56, 6-10.

[3] Xu, G., Lu, Y., Cheng, C., Li, X., Xu, J., Liu, Z., Liu, J., Liu, G., Shi, Z., Chen, Z., Zhang, F., Jia, Y., Xu, D., Yuan, W., Cui, Z., Low, S.S., Liu, Q., Adv. Funct. Mater., 2021, 29, 2100852.

[4] Sharifuzzaman, M., Chhetry, A., Zahed, M.A., Yoon, S.H., Park, C.I., Zhang, S., Chandra Barman, S., Sharma, S., Yoon, H., Park, J.Y., Biosens. Bioelectron., 2020, 169, 112637.

[5] P. Mostafalu, A. Tamayol, R. Rahimi, M. Ochoa, A. Khalilpour, G. Kiaee, Small 2018, e1703509.

[6] R. Rahimi, M. Ochoa, T. Parupudi, X. Zhao, I.K. Yazdi, M.R. Dokmeci, Sens and Actuat B: Chem., 2016, 229, 609-617.