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Highly stretchable, low Young's modulus and fatigue resistance hydrogels as transparent and flexible strain sensors

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Table S1. The impact of Py concentration on the stretchability of hydrogels

Concentration of Py aqueous solution(mL/mL)	0	0.001	0.002	0.004	0.006	0.008	0.01
Stretchability (time)	9	8	7	5	4	3	2

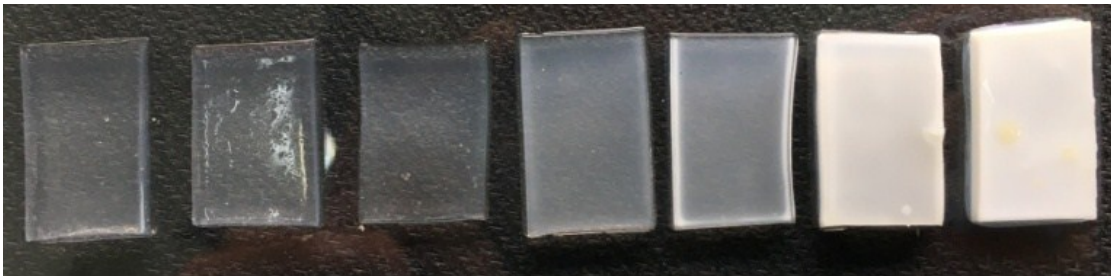

Figure S1. The photography of the hydrogels after dipped in different concentration of Py aqueous solution for 3 min.

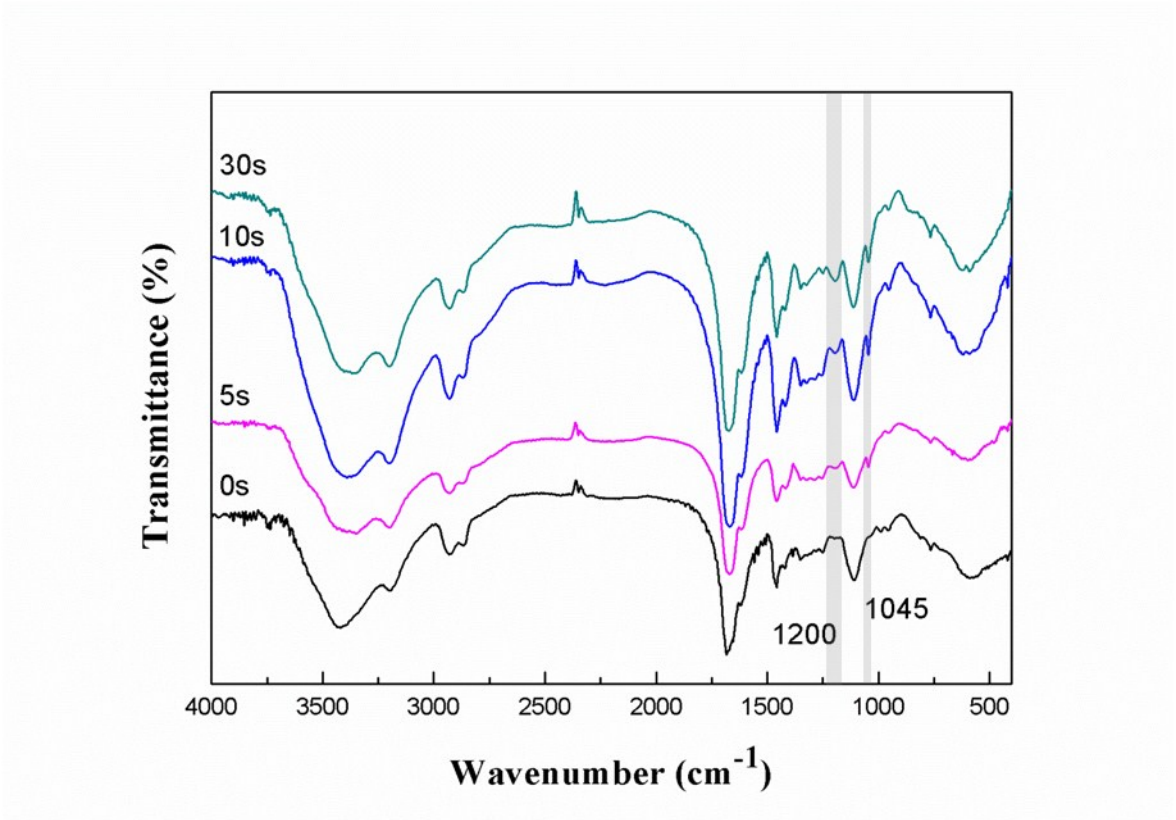

Figure S2. The FTIR spectra of the conductive hydrogels immersed in Py solution for different time: 0s, 5s, 10 and 30. We can find that, with the time in Py solution increased, the new peaks at 1200 and 1045 cm^{-1}, which can be ascribed to the stretching vibrations of polypyrrole,[1] were enhanced, confirming the amount of PPy increases with the time.

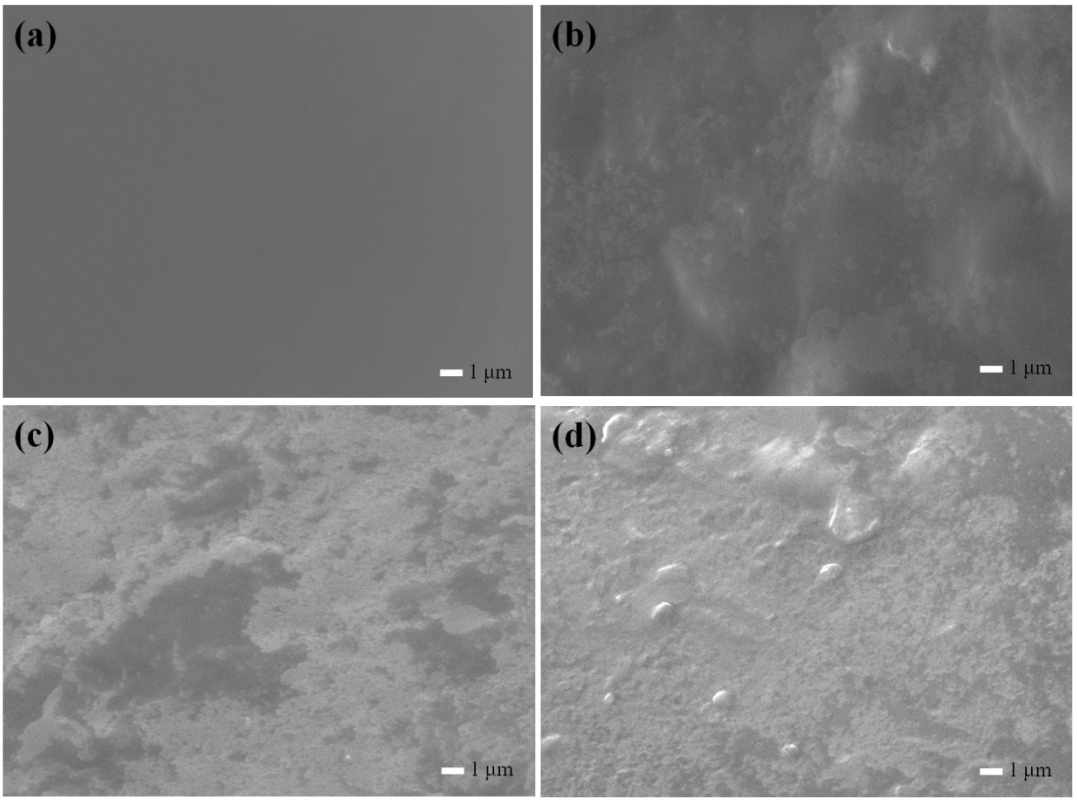

Figure S3. The SEM images of the hydrogels with different immersing time: 0s (a), 5s (b), 10s (c) and 30s (d).

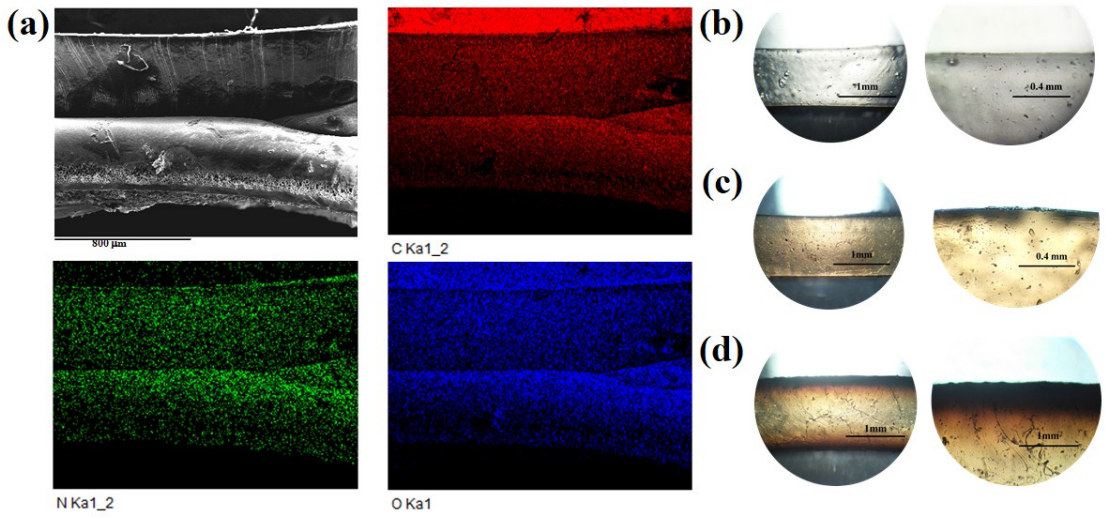

Figure S4. SEM images and mapping analysis of C, N, O element of the hydrogels with 30 s (a). The optical microscopy images of the cross-section of the hydrogels with immersing in Py solution for 0s (b), 5s (c) and 30 s (d).

Figure S5. The electric resistance images of three kinds of hydrogels: a) hydrogels with PPy, b) hydrogels with PPy after dialysising against water to remove the ions, c) hydrogels without PPy.

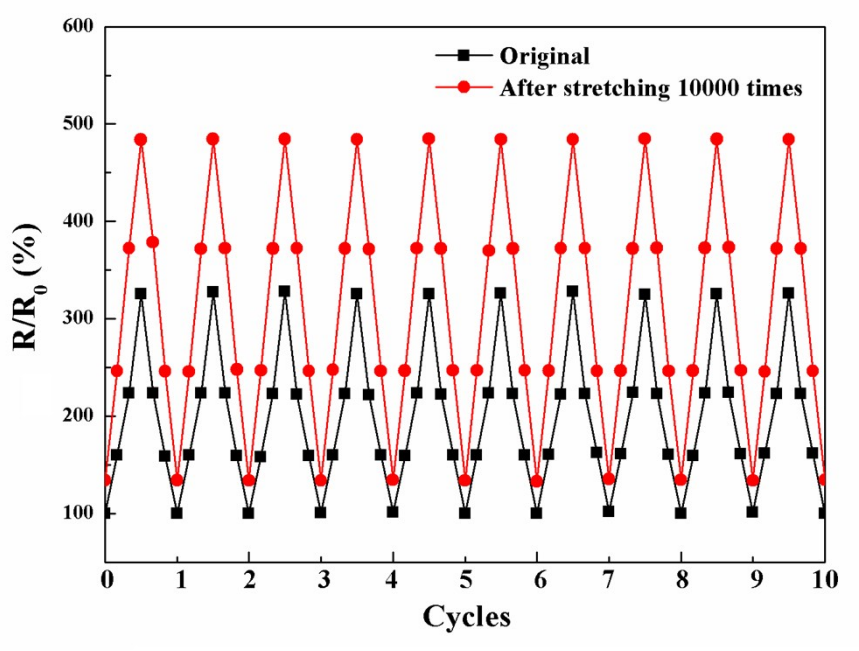

Figure S6. The relative resistance changes of the hydrogels were successively recorded with stretching 200% after 10000 stretching times.

Reference:

[S1] L. Al-Mashat, H.D. Tran, W. Wlodarski, R.B. Kaner, K. Kalantar-zadeh, Polypyrrole nanofiber surface acoustic wave gas sensors, Sensors Actuators B: Chem., 134 (2008) 826-831.