Electronic Supporting Information (ESI) for

Stretchable and Self-healable Electrical Sensor with Fingertip-Like Perception Capability for Surface Texture Discerning and Biosignal Monitoring

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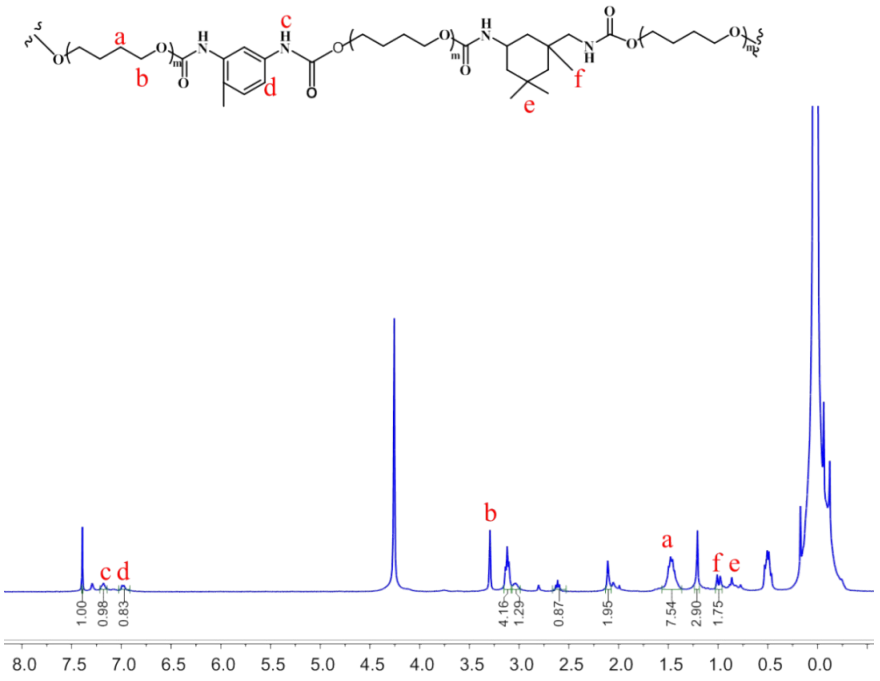
Synthesis of P-TDI-IP polymer. Polytetramethylene glycol (abbreviated as P, 18 g, 18.0 mmol) was put into a three-necked flask at 80 °C for 3 h to remove any moisture. A mixture solution of DMAc (10 mL) with TDI (6.77 g, 30.45 mmol), IP (2.00 g, 9 mmol), and DBTDL (0.78 g, 4.5 mmol) was added dropwise into the flask under argon atmosphere. The resulting mixture was stirred for 2 h, and viscous liquid was finally obtained. Molecular weights (Mw = 80,400; Mn = 50,600 (Đ = 1.6)) were determined according to gel permeation chromatography (GPC); and molecular structures were ascertained by 1 H NMR (400 MHz, CDCl3): δ 7.33 (d, J = 8.0 Hz, 4H), 6.97 (d, J = 8.0 Hz, 4H), 3.77 (s, 2H), 0.01 (b, 1325H).



1H NMR spectrum of P-TDI-IP in $CDCl_3$.

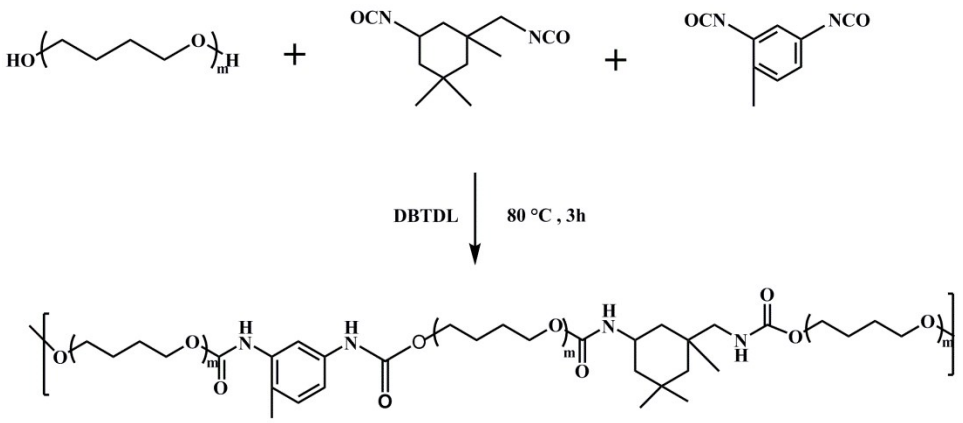


Figure S1. Synthesis of the P-TDI-IP polymer.

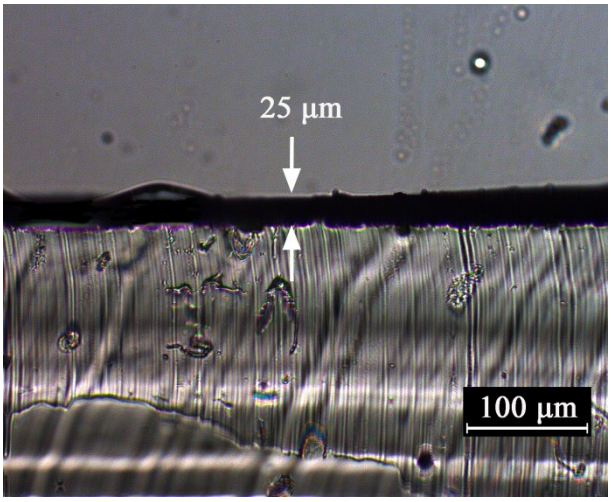


Figure S2. Optical microscopy images of Au-deposited P-TDI-IP elastomer substrates

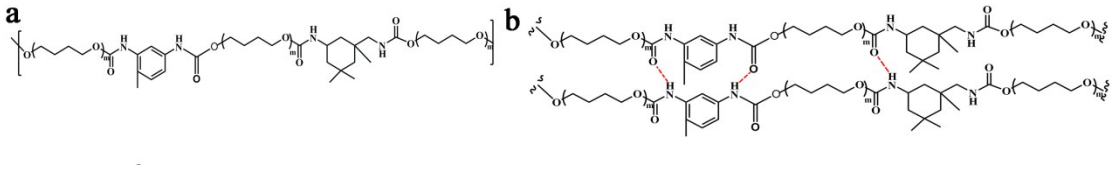
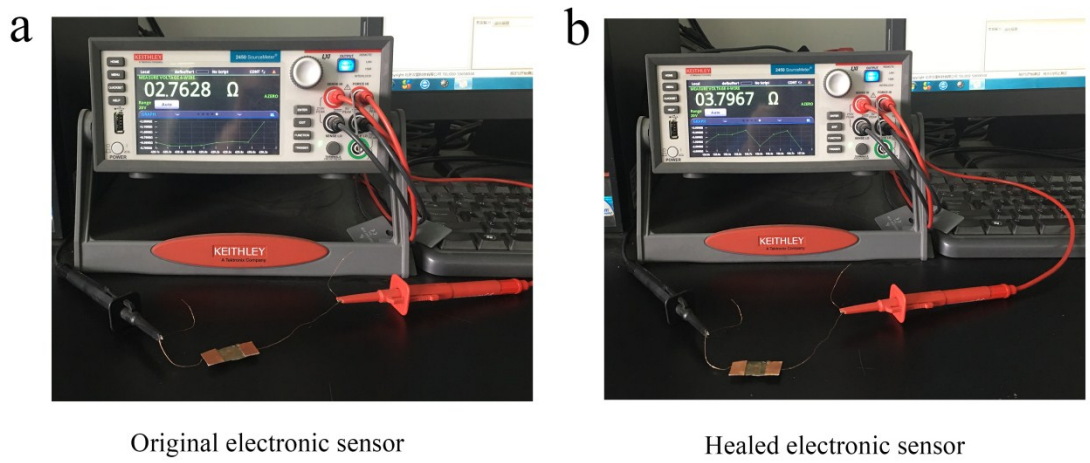


Figure S3. (a) Molecular structure of P-TDI-IP. (b) The P-TDI-IP polymer networks cross-linked by dynamic hydrogen bond.



Original electronic sensor

Healed electronic sensor

Figure S4. The resistance of electronic sensor (a) before and (b) after Healing.

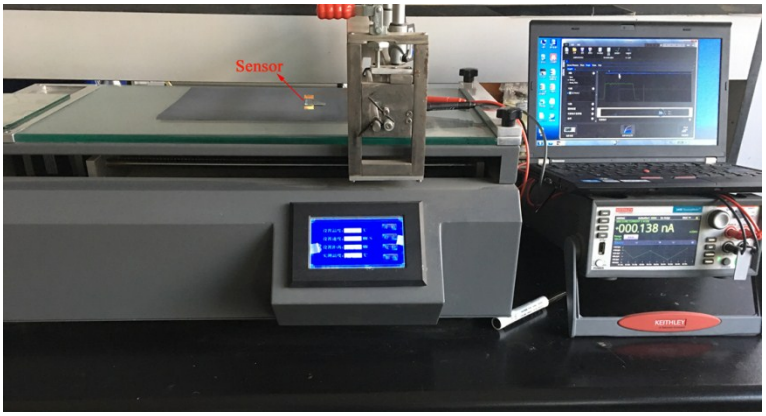


Figure S5. Optical photos of surface texture detection system