

Supporting Information

Semi-Permanent and Durable Nanoscale-Crack- Based Sensor by On-Demand Healing

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Fig. S1. Characteristics of self-healing polymer.

Fig. S2. Self-healing property of self-healing polymer after scratch.

Fig. S3. SEM images for crack gap deformation after 25,000 cycle test and after healing process with 50 °C for 10 mins.

Fig. S4. Healing rate of healed sensitivity compared to the original sensitivity in each healing process, 1st, 2nd, and 3rd healing.

Fig. S5. Gauge factor change of self-healable sensor for 25,000 cycles, of bending test.

Fig. S6. Relative resistance value changes with 2% strain after 1st, 2nd, 3rd, and 4th healing in 100,000 cycles.

Fig. S7. Cross-sectional SEM images of cracks on a sensor irradiated by IR LED

Fig. S8. Electronic skin applications with self-healable crack sensor for detection of various finger motions.

Audio S1. Vibration detection with self-healable crack sensor after propagation of cracks for the famous speech by Steve Jobs at Stanford University in 2005, “It was their farewell message as they signed off, ‘Stay hungry, stay foolish’”

Audio S2. Vibration detection with self-healable crack sensor after healing of cracks for the famous speech by Steve Jobs at Stanford University in 2005, “It was their farewell message as they signed off, ‘Stay hungry, stay foolish’”

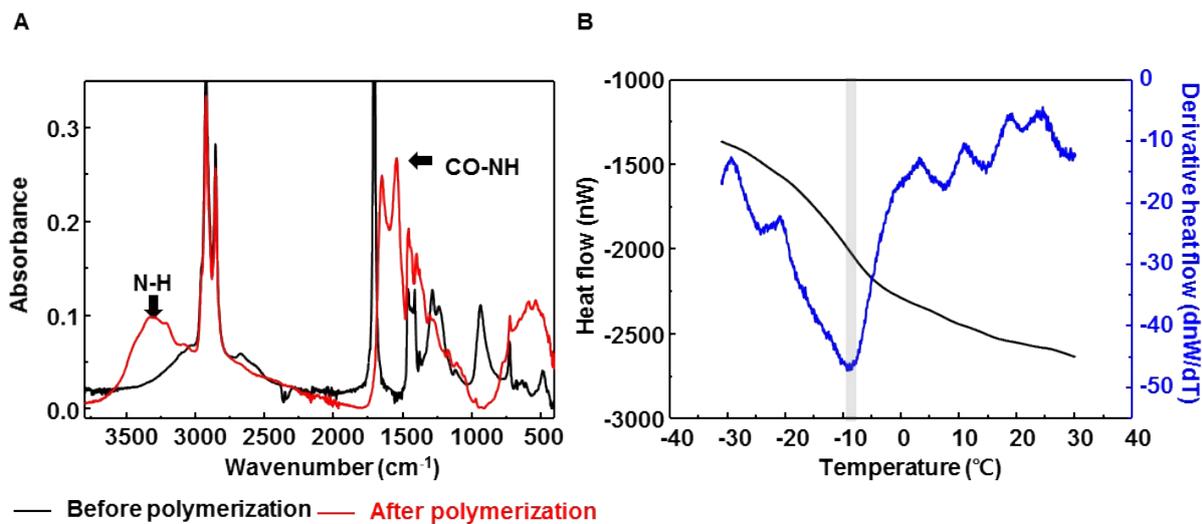


Fig. S1. Characteristics of self-healing polymer. a) Fourier transform infrared spectroscopy (FTIR) data with 9-[(Z)-non-3-enyl]-10-octylnonadecanedioic acid and after polymerization. N-H bond and CO-NH bond are generated during the polymerization. b) Differential scanning calorimetry (DSC) data with self-healing polymer which have the glass transition of about -8°C.

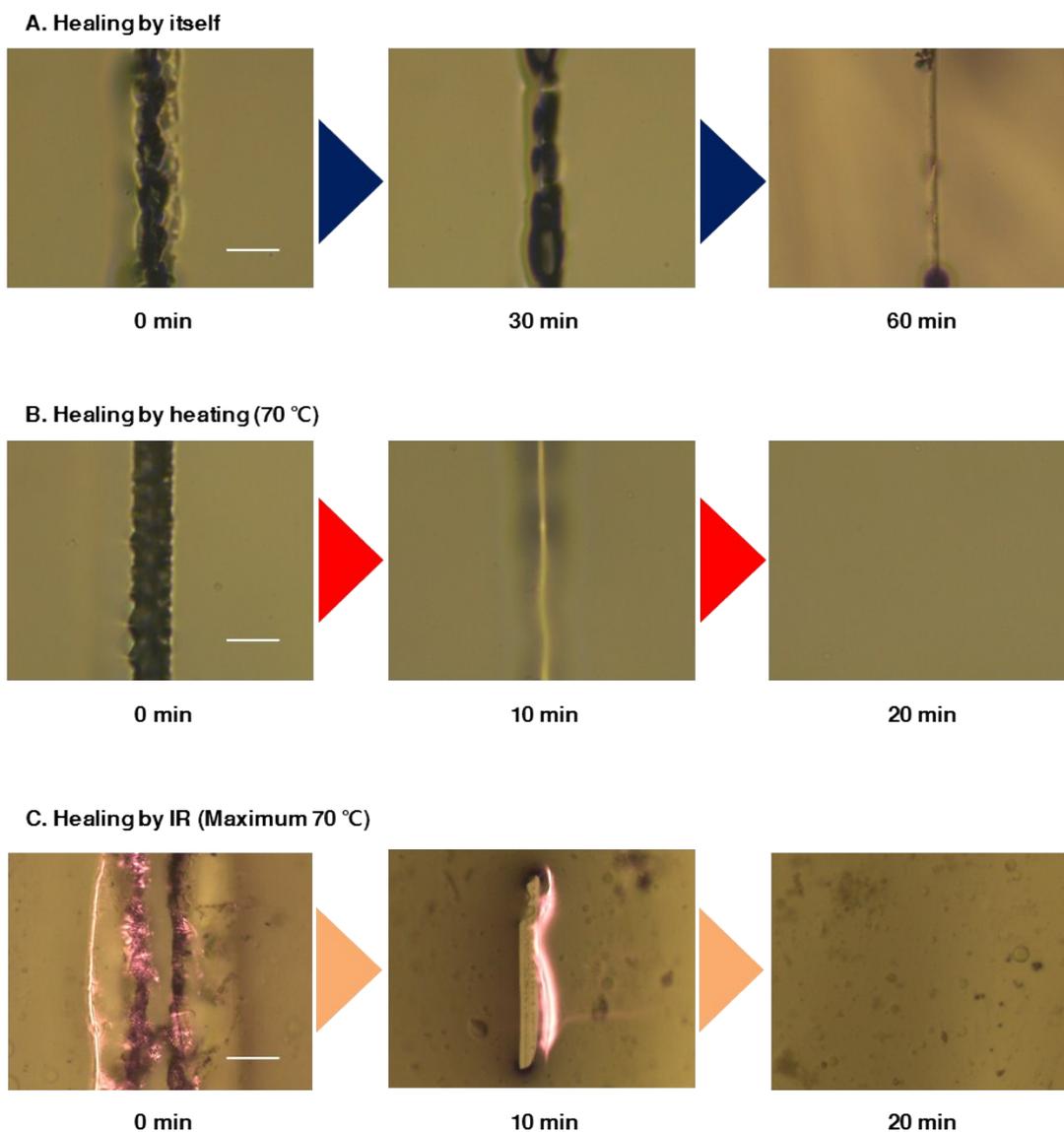


Fig. S2. Self-healing property of self-healing polymer after scratch. (scale bar: 30 μm) a) Self-healing property for 0, 30, 60 minutes. b) Healing property with heating on 70 °C hot plate for 0, 10, 20 minutes. c) Healing property with infrared red LED heating for 0, 10, 20 minutes.

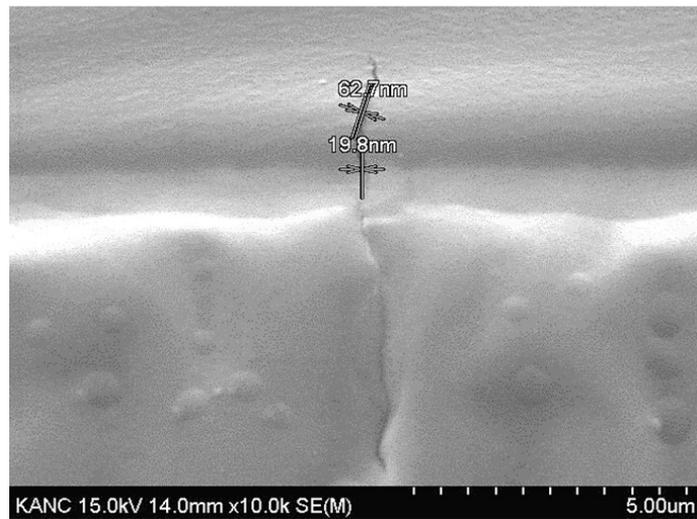
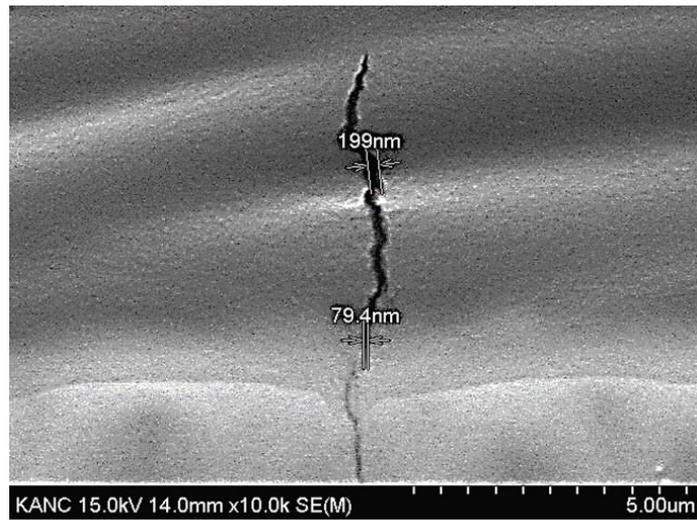


Fig. S3. SEM images for crack gap deformation after 25,000 cycle test (upper) and after healing process with 50 °C for 10 mins.

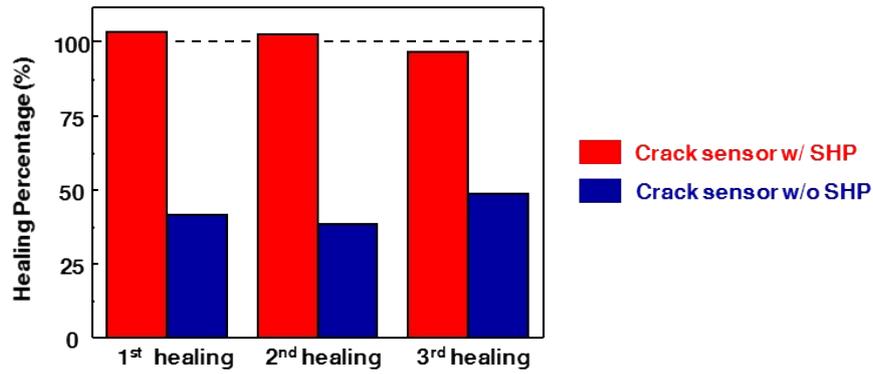


Fig. S4. Healing rate of healed sensitivity (red) compared to the original sensitivity (blue) in each healing process, 1st, 2nd, and 3rd healing.

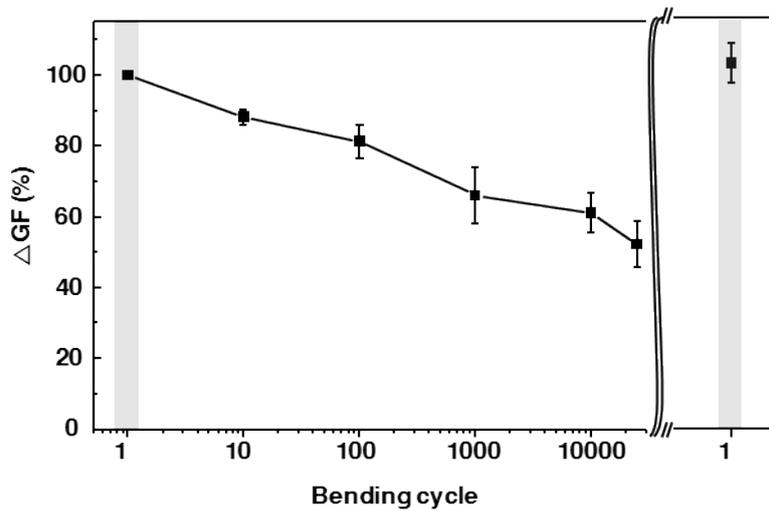


Fig. S5. Gauge factor change of self-healable sensor for 25,000 cycles of bending test.

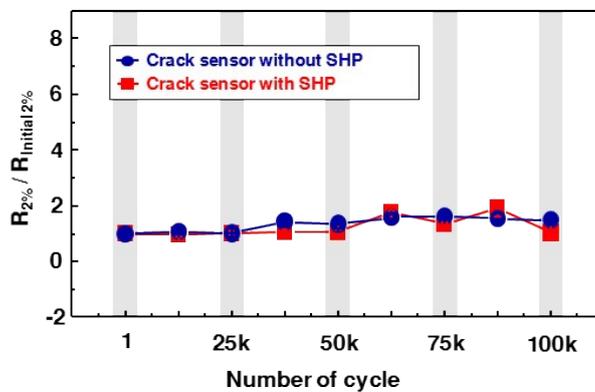


Fig. S6. Relative resistance value changes with 2% strain after 1st, 2nd, 3rd, and 4th healing (gray) in 100,000 cycles.

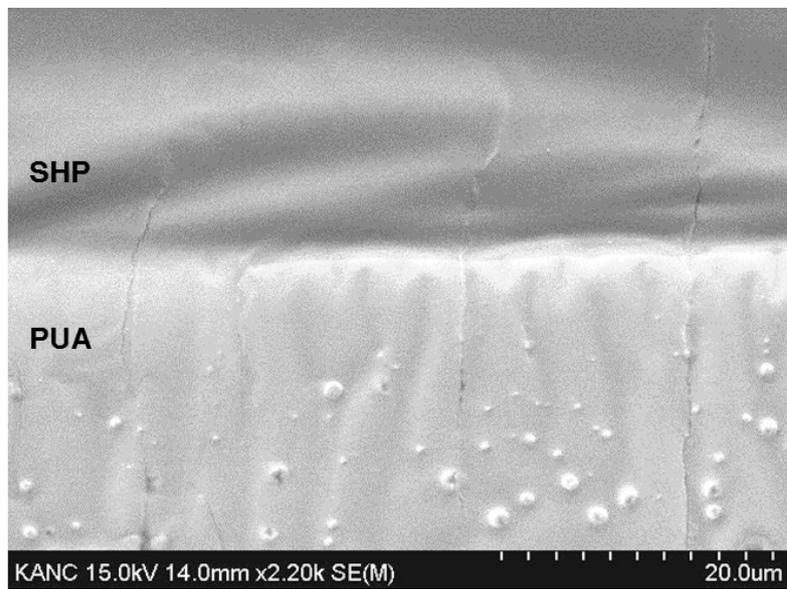
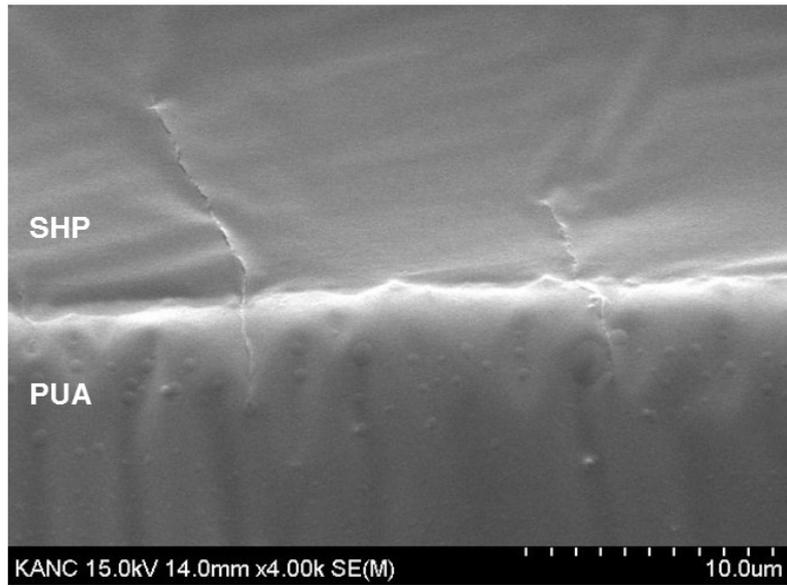


Fig. S7. Images for the regions in the self-healable crack sensor with IR heating by scanning electron microscope (SEM).

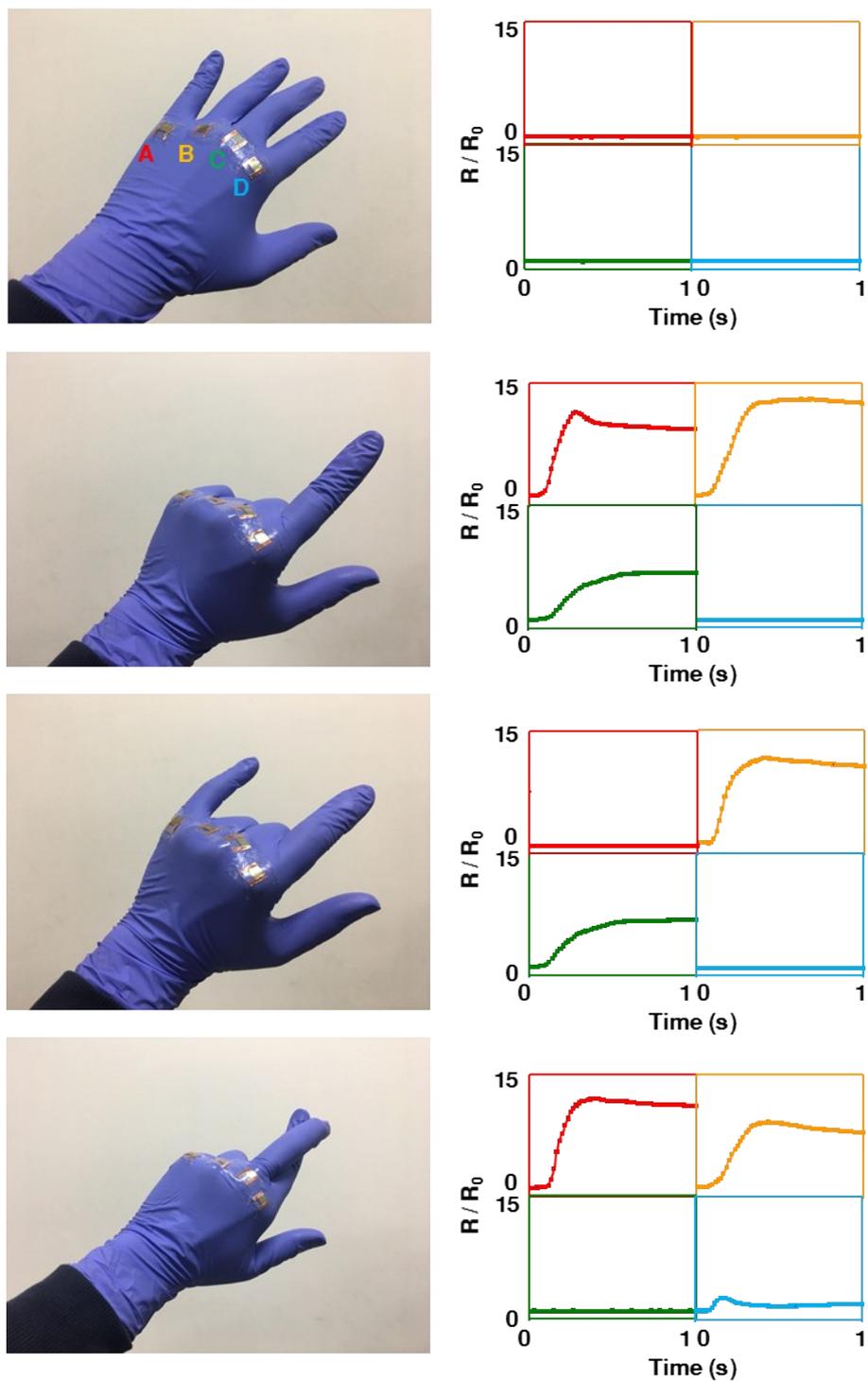


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