

Supplementary Materials: Polyimide Encapsulation of Spider-inspired Crack-based Sensors for Durability Improvement

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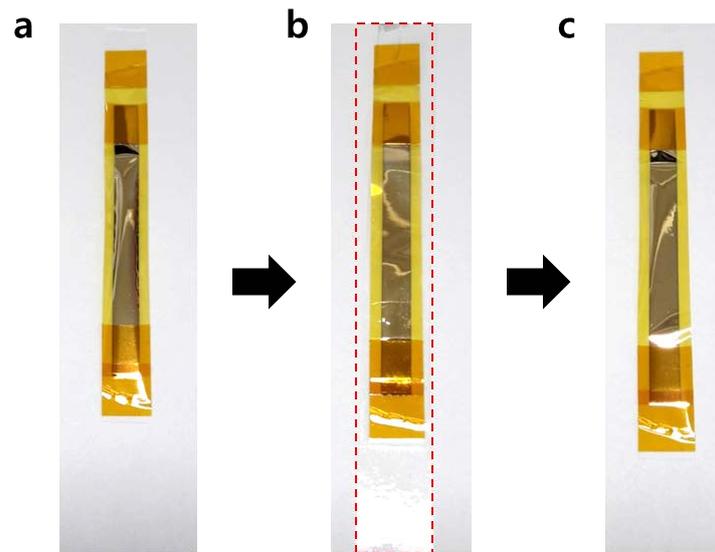


Figure S1. Scotch tape test with an adhesion force of 4.5 N/25 mm for PI substrate crack sensor (reference number of 600, 3M). (a) PI substrate crack sensor before scotch tape test. (b) Taped over the entire sensor. (c) After taking off the tape.

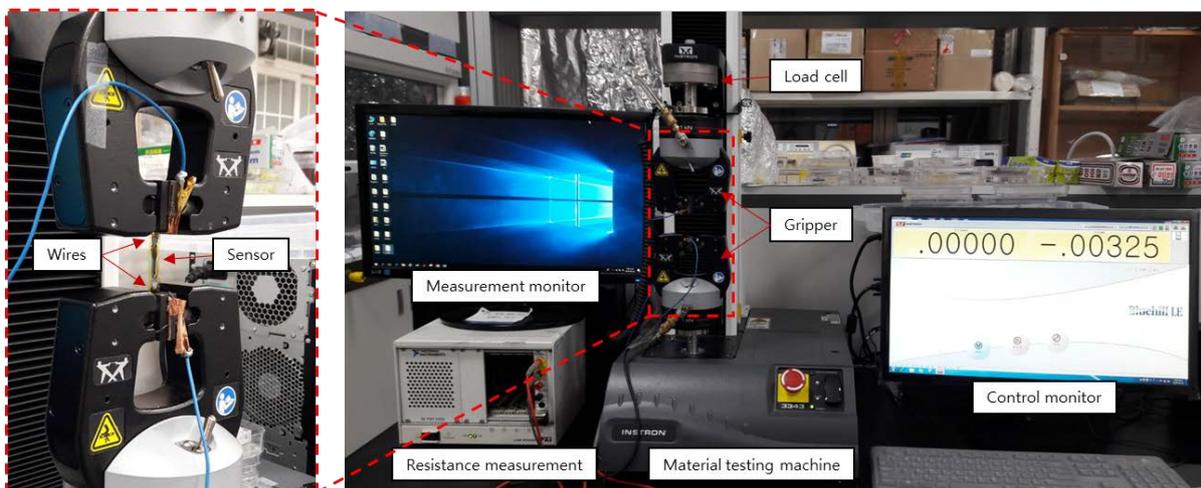


Figure S2. Experimental set up for measuring resistance variation.

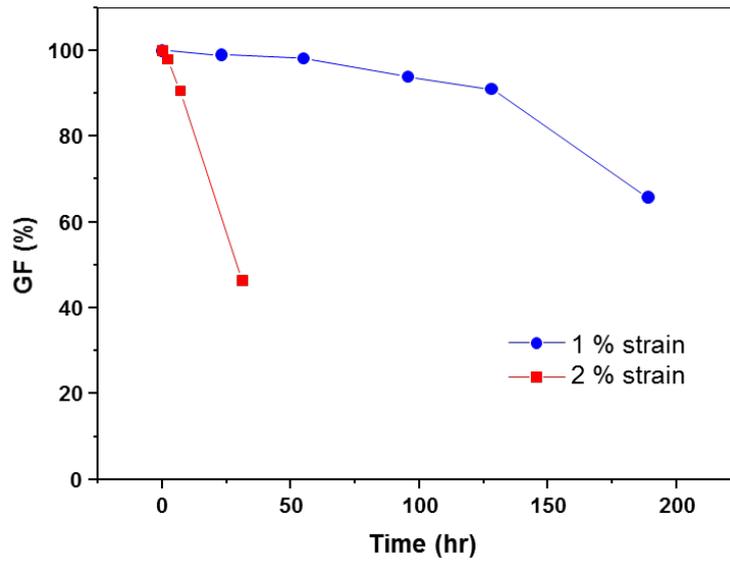


Figure S3. The performance degradation by dipping into water: Red line is relative gauge factor degradation in 2 % strain, Blue line is that of 1 % strain.

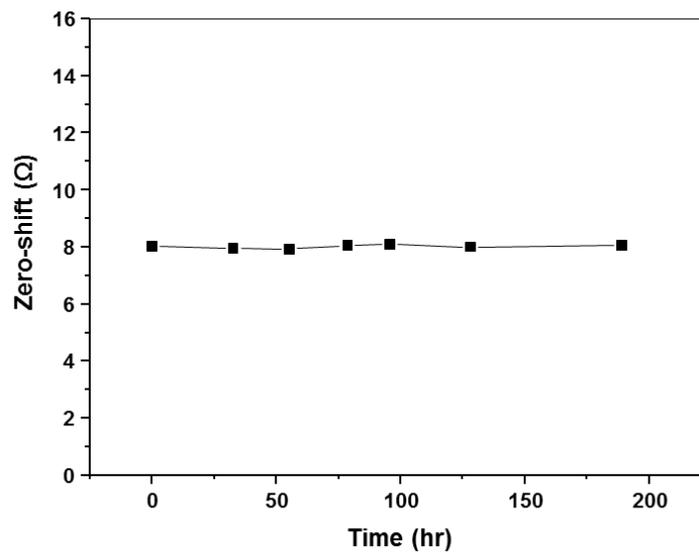


Figure S4. Base line shift by dipping into water without straining.

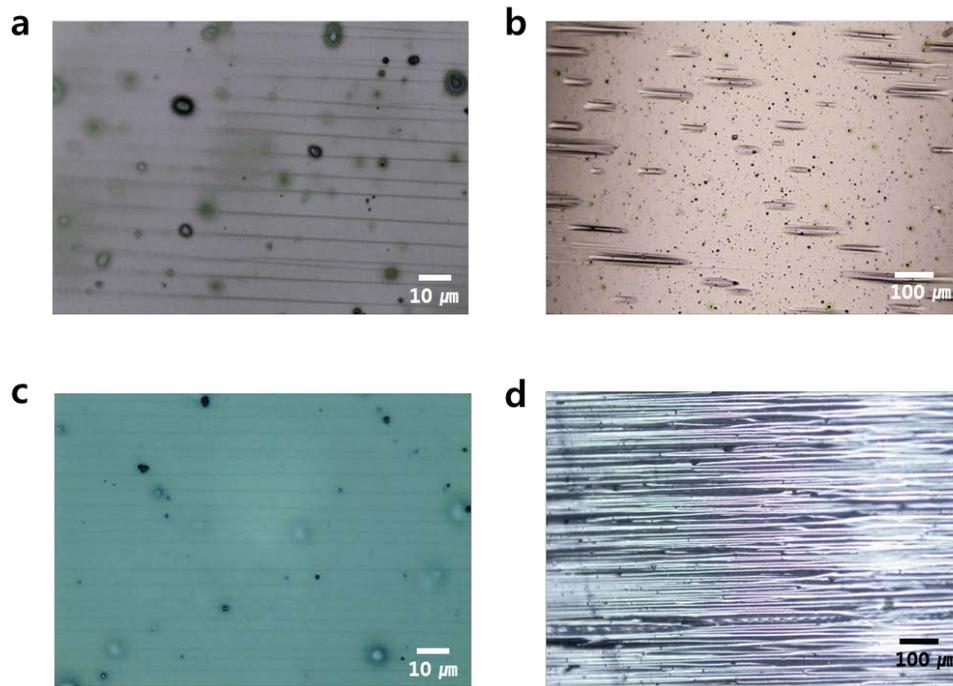


Figure S5. Delamination of metal film due to penetration of saline solution. (a) PI encapsulated crack sensor before immersion. (b) PI encapsulated crack sensor after immersion in saline solution for 35 hours. (c) PDMS encapsulated crack sensor before immersion. (d) PDMS encapsulated crack sensor after immersion in saline solution for 15 hours.

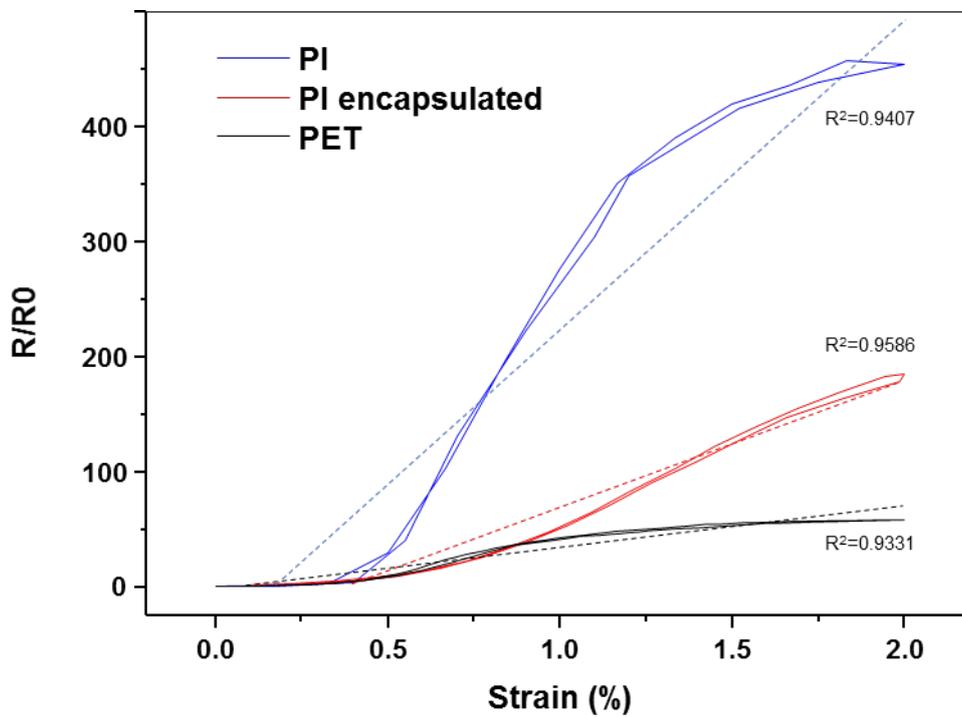


Figure S6. Strain-response curve of crack sensors.

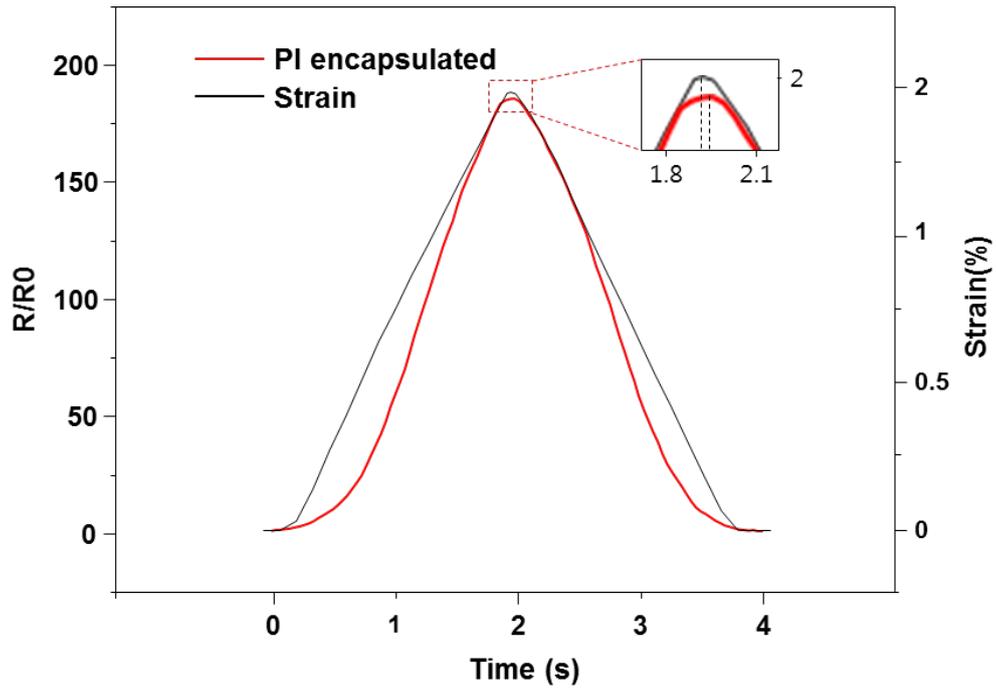


Figure S7. The response time of the encapsulated crack based sensor.