# Electronic Supplementary Information

## Photonic Sintering Derived Ag Flake/Nanoparticle Based Highly Sensitive Stretchable Strain Sensor for Human Motion Monitoring

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**Table S1.** Performance of recently reported conductor/elastomer composite-based stretchable strain sensors.

| Reference | Materials | Stretchability [%] | Gauge factor |
|---|---|---|---|
| This study | Ag flakes/Ag nanocrystals/PDMS | 80 | 7.1 |
| [5] | Carbon conductor/Ecoflex | 100 | 3.8 |
| [32] | Carbon black/PDMS | 10 | 1.8–5.5 |
| [1] | Carbon nanotube/PDMS | 200 | 0.82 |
| [3] | Ag nanowire (NW)/PDMS | 70 | 14 |
| [17] | Ag NW/PDMS | 50 | 0.7 |
| [18] | Ag NW/PEDOT:PSS/PDMS[a)] | 60 | 1.36 |
| [33] | Ag NW/polyaniline/latex | 100 | 61 |
| [34] | Carbon nanotube/Carbon black/PU | 200 | 5–140238 |

[a)] PDMS : polydimethylsiloxane, PEDOT:PSS : poly(3,4-ethylenedioxythiophene) polystyrenesulfonate and PU: polyurethane.

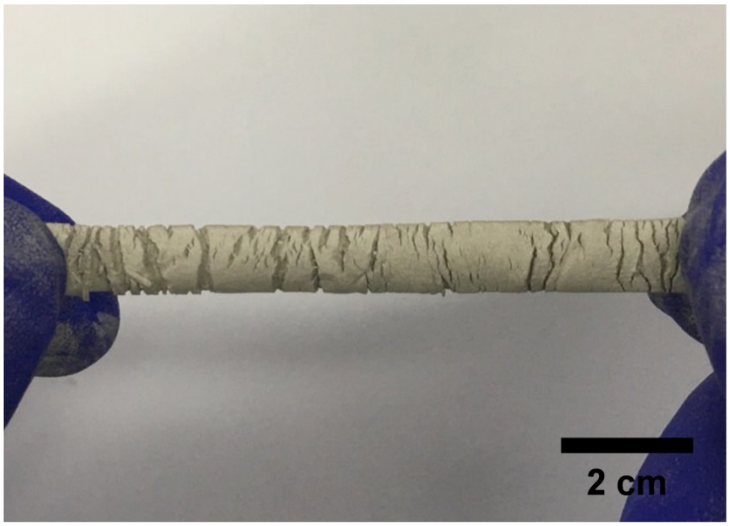


**Figure S1.** Photograph of the Ag flake/PDMS composite conductor with >85 wt% of Ag flakes. As strain is applied to the composite, mechanical failure occurs with the formation of cracks.

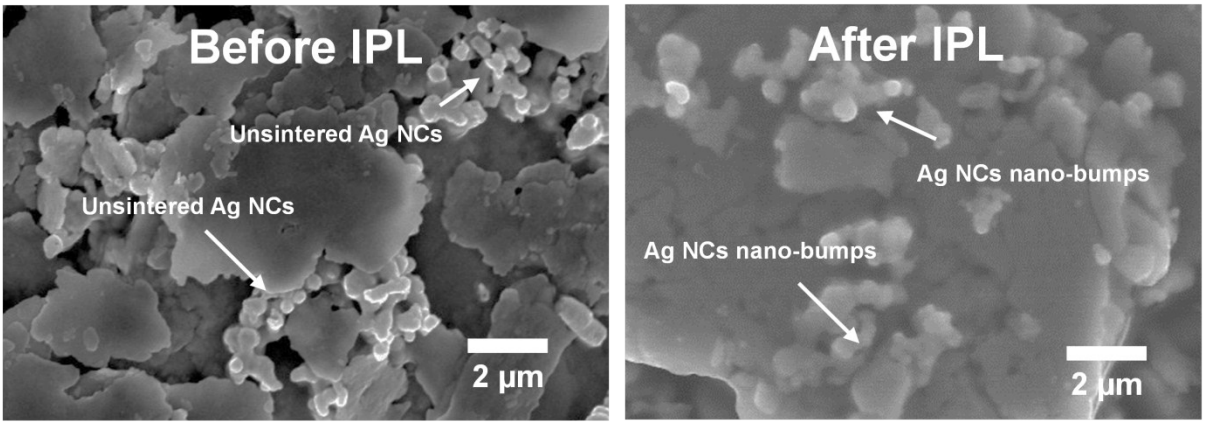


**Figure S2.** Field emission scanning electron microscopy (FESEM) images of the Ag flake/NC composite surface before and after IPL sintering (Ag flakes:Ag NCs = 8:2).

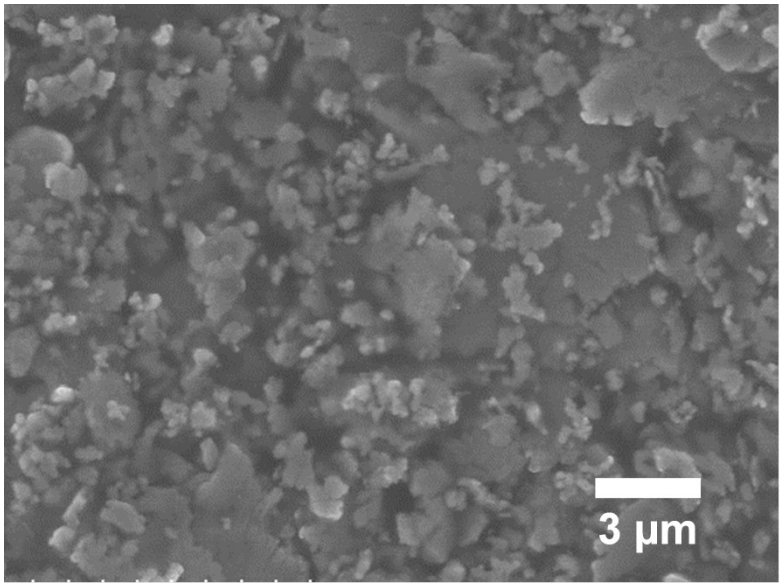


**Figure S3.** FESEM image showing the distribution of Ag NCs based nano-bump.

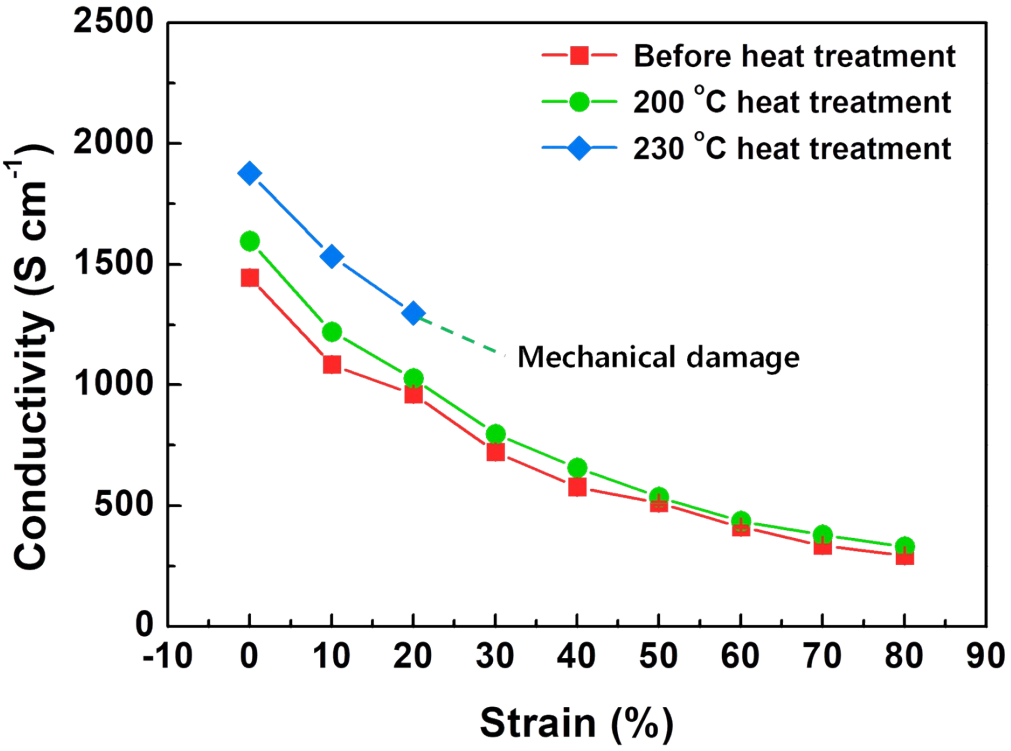


**Figure S4.** Electromechanical properties of the elastic conductor after conventional thermal heat treatment at various temperatures.

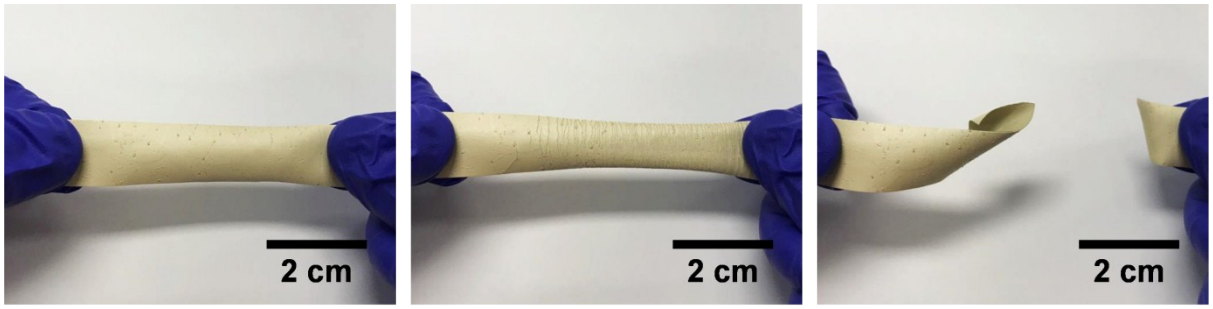


**Figure S5.** Photographs of the over-cured conductive elastomer. Formation of cracks and film breakage occur as the strain is applied.

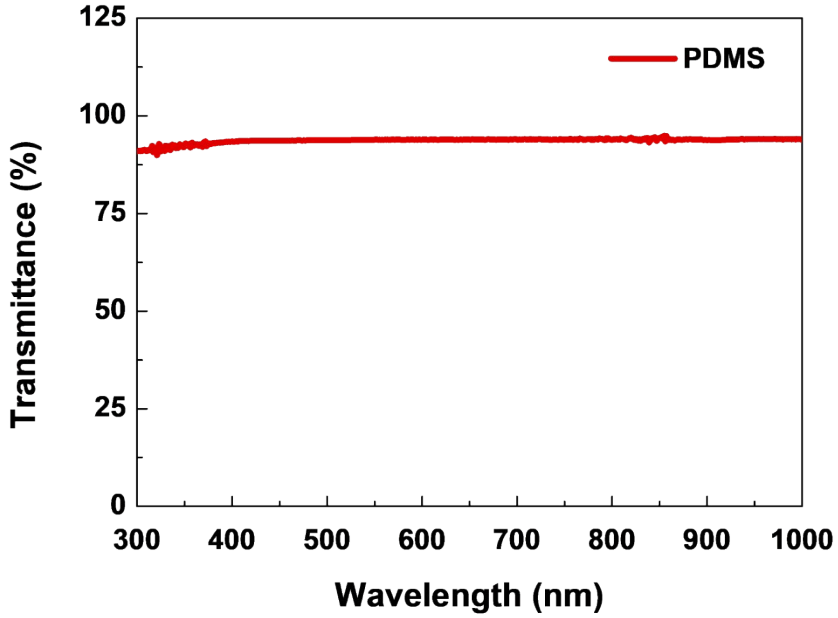


**Figure S6**. The transmittance of pristine PDMS measured by a UV-vis spectrophotometer (Lambda 750S model, PerkinElmer, Inc.) in the wavelength range of 300−1000 nm.

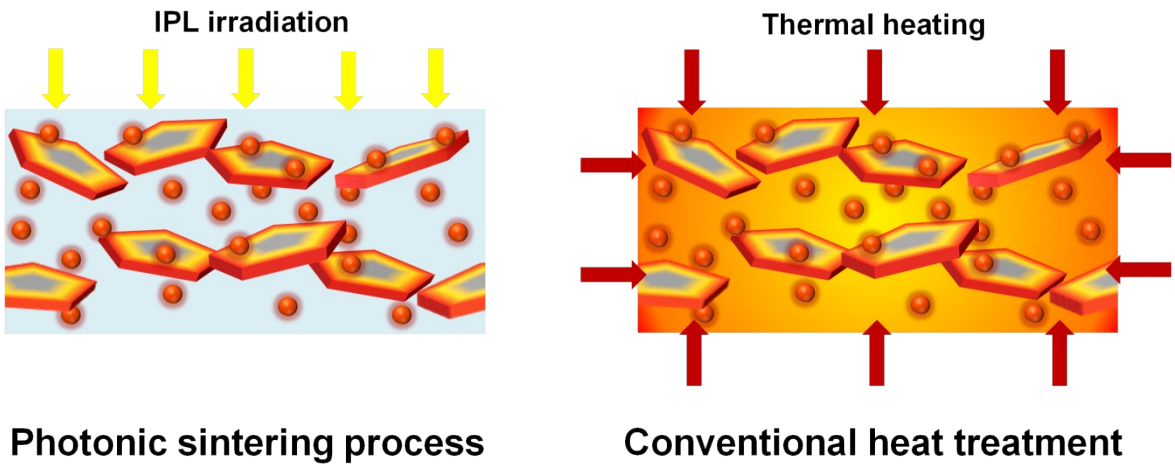


**Figure S7.** Schematic diagram for the heating mechanism of photonic sintering process and conventional heat treatment.

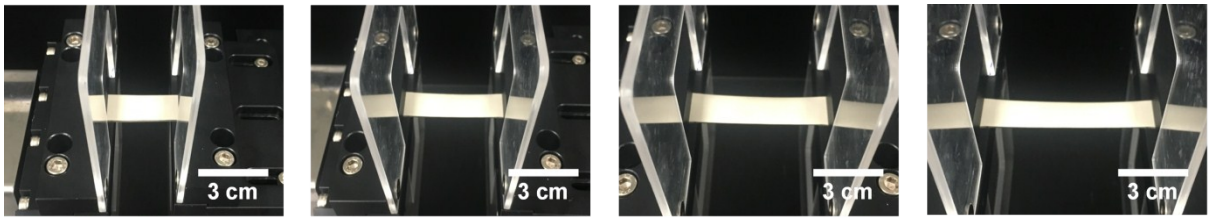


**Figure S8.** Photographs of an elastic conductor undergoing 10,000 cycles of stretching test at various strain values (0, 30, 50, and 80%).

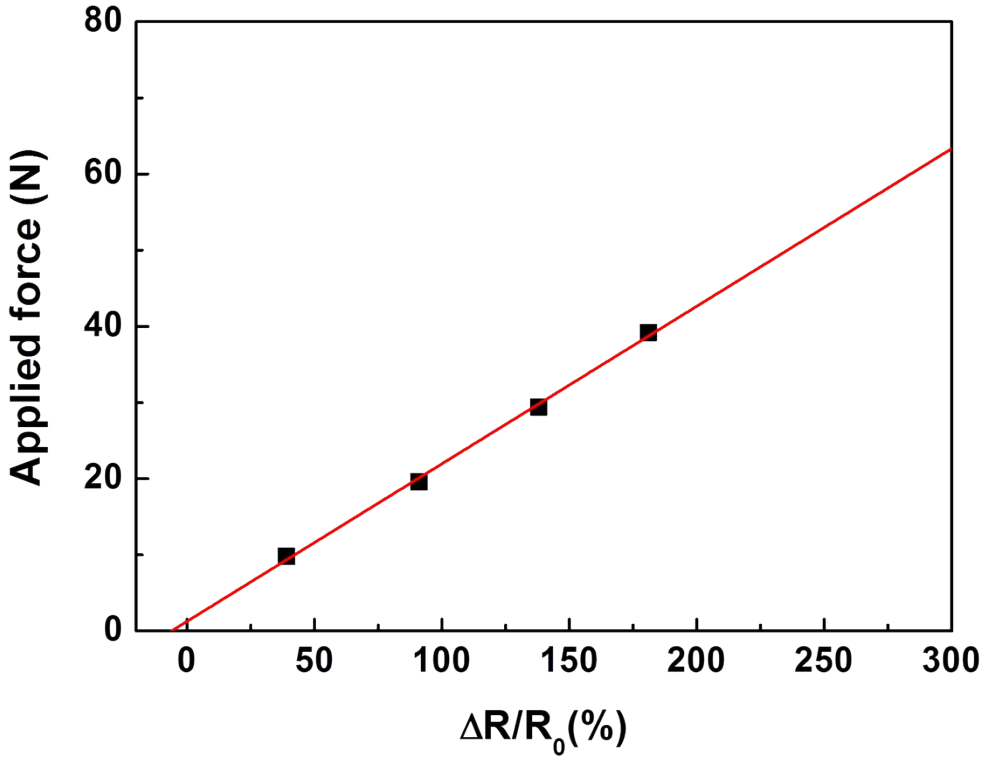


**Figure S9.** Plot of the applied force vs. relative resistance change (black dots). Linear regression was performed to derive the equation for determining the applied force as a function of the relative resistance change (red line).

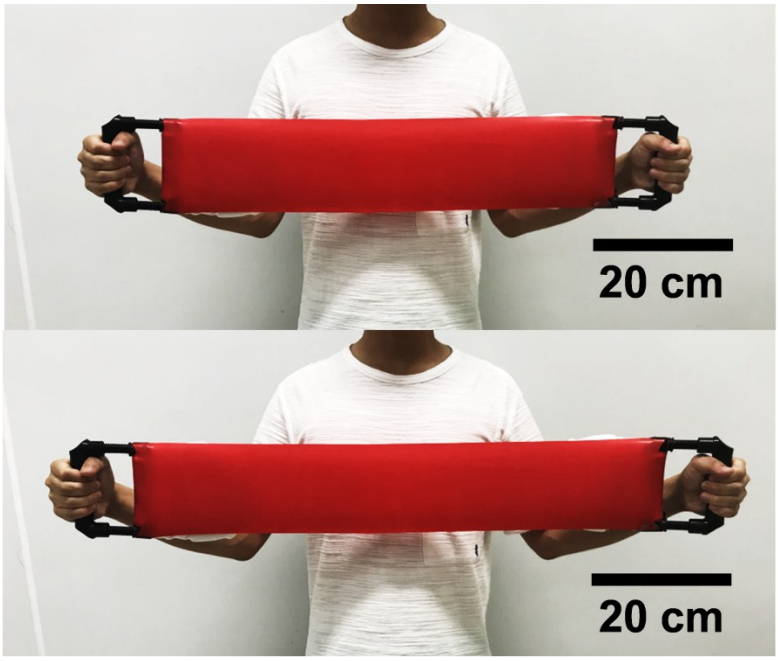


**Figure S10.** Photographs illustrating the real-time monitoring of the muscle strength using our sports performance monitoring band.