Supporting Information

High performance strain sensor based on buckypaper for full-range detection of human motions

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1. The relationship between resistance change and strain during the stretching process.

The relationship between $\Delta R/R_0$ and strain can be well fitted using an exponential function, indicating a regularity exists between them. Based on this exponentially increased relationship, $\Delta R/R_0$ and gauge factor of this strain sensor becomes higher and higher with the strain gradually increases, which is an outstanding advantage of this sensor.

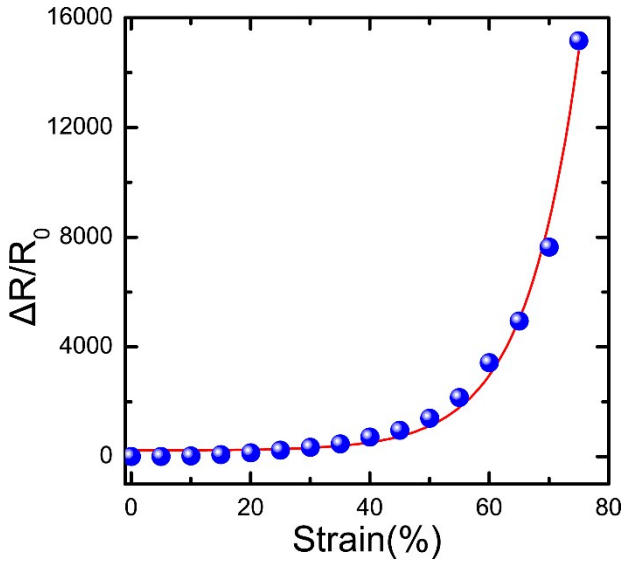

Figure S1. The relationship between resistance change and strain during the stretching process.

2. The relationship between tensile force and strain of a PDMS film during stretching process.

The strain sensor consists of PDMS and buckypaper. PDMS is an elastomer which has a high elastic constant. In this work, the elastic behavior of the buckypaper-based strain sensor can be mainly ascribed to the high elasticity of PDMS. As shown in Figure S2, we tested the force-strain relationship of a PDMS film with the same thickness (1 mm) as the sensor reported in our manuscript. It is observed that the force increases linearly as the strain gradually increases from 0 to 75% during the stretching process. This can explain why the sensor displays linear elastic behaviors within the 0-75% strains.

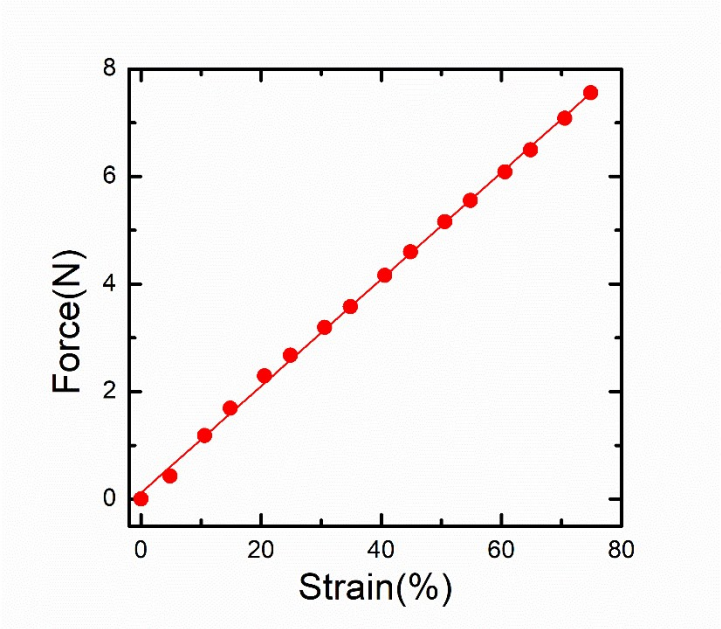

Figure S2. The relationship between tensile force and strain of a PDMS film during the stretching process.