SOUTH DAKOTA SCHOOL OF MINES & TECHNOLOGY

OFFICE OF ECONOMIC DEVELOPMENT

Highly Stretchable Strain Sensor for Human Motion Monitoring

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LICENSING OPPORTUNITIES

South Dakota School of Mines Office of Economic Development is actively seeking exclusive and/or nonexclusive licensing opportunities. Joint development opportunities are also available.

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Overview

To detect human motions, e.g. the large-scale motions like bending of fingers, arms, or legs, strain sensors need to have high stretchability and sensitivity. However, conventional strain sensors, which are made of thin metal foils or semiconductors, typically detect only small strain and have limited sensitivity. Researchers at SD Mines developed a simple method to assemble a highly stretchable and highly sensitive strain sensor.

Description

This work presents a simple method to assemble a highly stretchable and highly sensitive strain sensor. Carbon nanofibers are sandwiched in two layers of elastomer PU to form the sensor. The CNFs/PU strain sensor shows large strain range of 300%, high sensitivity with gauge factor up to 72.5, and superior stability and durability during 8000 cycles of stretch/release. These parameters are among the best ones of the piezoresistive strain sensors reported in the recent literature. Additionally, the CNFs/PU strain sensor show fast, stable and reproducible response following the bending movement of finger, wrist, and elbow. The flexible CNFs/PU strain sensor with these excellent properties could have broad applications in wearable devices for human motion monitoring.

Advantage

- Stretchable sensors that have high stretchability of strain up to 300%
- High sensitivity of gauge factor up to 72.5
- Durability and stability during the stretch/release test for 8000 cycles
- Suitable for human motion monitoring, such as bending of finger, wrist and elbow
- Serves as a new technology for broad applications in wearable devices for human motion monitoring