Flexible Stretchable and Self-healable Pressure and Touch Sensor based on Silver and Copper Nanowires

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Abstract

Nanowires are widely investigated from 2002. Especially silver naowire is a hot topic as a impressive candidate for transparent conducting film from 2009. After that many different kinds of devices based on AgNW are published, OLED, OPV, sensors and other devices need electrode. Here, we design a novel textile-based piezoresistive pressure sensor based on AgNWs-decorated cotton made by solution-based techniques for top bridge, and a screen-printing silver circuit on cotton substrate for bottom electrode. The entire fabrication process is facile and economical, and suitable for future large-scale integrated production. Moreover, benefiting from the cotton substrate and natural layered and porous microstructure of the cotton fibers, our piezoresistive pressure sensors are breathable, and achieve extremely excellent detection performance, including extra-high sensitivity of 2.46 ×104 kPa-1 to 5.65×105 kPa-1 over a wide pressure region(0-30 kPa), giant high on/off ratio of ≈106，fast response time (<6ms), and low detection limit(0.76 Pa). Thanks to these features, the device not only have the ability detect various tiny signals of the human body, but also can be widely applied for human-computer interactive system as a real-wearable sensor platform, which was demonstrated by playing a piano and computer games.

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| Figure 1. The fabrication of wearable pressure sensors |

References

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