Directly drawing flexible capacitive sensors on copying tissues

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Abstract

Flexible pressure sensors that enable detection of tiny forces are promising candidates for application in intelligent devices, such as smart textiles, electronic skins, human–machine interfaces, human health monitoring and motion tracking systems, and diagnostic devices. Despite the fact that current capacitive-type pressure sensors have demonstrated high sensitivity, a large detection region and the capability to achieve non-contact detection of proximity, strategies for producing such high performance sensors still involve complex fabrication procedures and the use of polymers and costly materials. At present, a green, facile and cost-effective fabrication of high-performance flexible pressure sensors is highly desired, but it remains a challenging task. Here,we report the fabrication of paper-based capacitive pressure sensors by pencil drawing of loop- and disc-shaped graphite electrode arrays on copying tissue sheets. Graphene oxide (GO)-enhanced foam-like paper, prepared by freeze-drying of paper cellulose fibers and GO composites, was employed as a high-performance dielectric layer. The whole fabrication process is simple, green and cost-effective, and the obtained capacitive pressure sensors are highly sensitive to pressure and approaching objects, enabling detection of finger motion, touching and proximity.

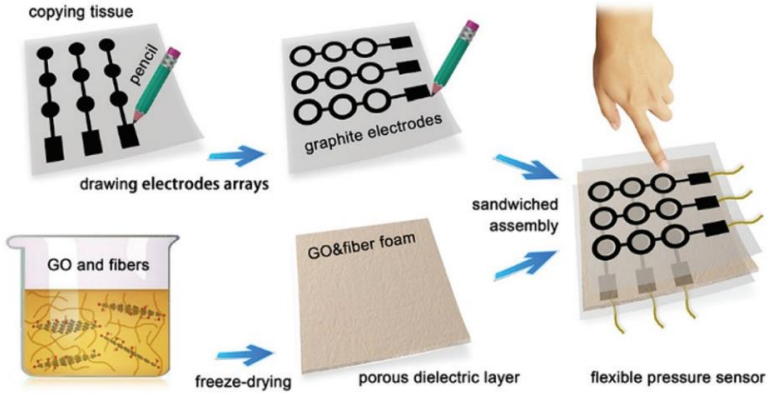

Figure 1: Schematic illustration of the fabrication of a pressure sensor with pencil drawn graphite electrodes and GO&fiber foam paper as the dielectric layer.

References

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