Mulberry paper-based graphene strain sensor for wearable electronics with high mechanical strength and large area

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ABSTRACT
The technology of flexible and wearable strain sensors has developed rapidly in recent years. In this work, we prepared a mulberry paper-based graphene strain sensor via bar coating technique for wearable electronics with high mechanical strength and large area. For the fabrication of strain sensor, graphene flakes dispersion was coated on the mulberry papers with various coating thicknesses. Then, we investigated the characteristics of strain sensor such as, electrical performance with strain, mechanical strength, flexibility, environmental stability and degradability of the as-fabricated strain sensor. Experimental results suggest that the spacing between graphene flakes plays a decisive role in determining the sensing properties. In addition, mulberry paper has a long fiber length and high air permeability, resulting in improvement of mechanical durability and a wide range of coatings. Overall, the mulberry paper-based graphene strain sensor with a bar-coating process can be a cost-effective and time-consuming alternative to manufacturing wearable strain sensors and has great potential in next-generation wearable intelligent system applications.

Keywords: bar coating; flexibility; degradability; environmental protection; strain sensor