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Advanced piezoresistive sensor achieved by amphiphilic nanointerfaces of Graphene oxide and biodegradable polymer blends.

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Abstract

This work focuses on the preparation of a piezoresistive sensor device, by exploiting an amphiphilic sample of graphene oxide (GO) as a compatibilizer for poly(lactic acid) (PLA)-Poly(ethylene-glycol) (PEG) blends. The presence of GO determined a high stiffening and strengthening effect, without affecting toughness, and allowed a good stability of mechanical properties up to 40 days. Moreover, GO endowed the materials with electrical properties highly sensitive to pressure and strain variations: the biodegradable pressure sensor showed a responsivity of 35 μA/MPa from 0.6 to 8.5 MPa, a responsivity around 19 μA/MPa from 8.5 to 25 MPa. For lower pressure values (around 0.16-0.45 MPa), instead, the responsivity increases up to 220 μA/MPa in terms of $\Delta I/\Delta P$ (i.e. $(\Delta I/\Delta I_0)/P$ close to 1 kPa^{-1}). Furthermore, this novel sensor is able to

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