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Graphene-Based Strain Gauge on a Flexible Substrate

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A flexible laser-reduced graphene oxide (LRGO) strain gauge formed on a polyethylene terephthalate (PET) substrate is fabricated using a new technique suitable for large-scale and low-cost mass production. The LRGO film is initially synthesized by drop-casting a graphene oxide (GO) solution on a flexible PET substrate, followed by the simultaneous reduction and patterning of the dried film with a 1.8 W carbon dioxide laser. The LRGO film is then characterized by X-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, Raman spectroscopy, and scanning electron microscopy (SEM). A multilayer LRGO film with an estimated average thickness of 2.5 μm and good adhesion to the PET substrate is obtained. The measured gauge factor of the LRGO strain gauge is 61.5.

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