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# Synthesis of grapheme oxide grafted poly(lactic acid) with palladium nanoparticles and its application to serotonin sensing

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## Abstract

Graphene oxide (GO) has treated with methylene diphenyl diisocyanate (MDI) and subsequent 1,4-butanediol (BD) to create an anchoring OH site on the surface of GO (GO-MDI-OH). The OH groups of GO-MDI-OH were the initiators of the polymerization of poly(lactic acid) (PLA). The subsequent GO-g-PLA was synthesized by the polymerization reaction in the presence of GO-MDI-OH and PLA. The synthesized materials were characterized via  $^1\text{H-NMR}$ , Fourier transform infrared spectroscopy (FT-IR), Raman spectroscopy, X-ray photoelectron spectroscopy (XPS), thermal analysis (differential scanning calorimeter (DSC), and thermogravimetric analysis (TGA)). The surface morphologies and degree of dispersions at G-g-PLA-metals were observed using a field emission scanning electron microscope (FE-SEM) and a transmission electron microscopy (TEM). The electrical conductivity of G-g-PLA-Pd was largely enhanced compared with those of GO and GO-g-PLA. G-g-PLA-Pd was used for the electrochemical detection of serotonin. Electrocatalytic activities were verified from the cyclic voltammetry (CV) and amperometric response in a 0.1M phosphate buffer solution (PBS). A significantly higher concentration range (0.1~100.0  $\mu\text{M}$ ) and a lower detection limit ( $8.0 \times 10^{-8}$  M, where  $s/n=3$ ) were found at the G-g-PLA-Pd modified glassy carbon electrode (GCE).

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