

Polydiacetylene functionalized graphene nanosheets with high biomolecular recognition capability: synthesis, micro patterning and electrochemical biosensor application

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Graphene nano sheet hybridized with polydiacetylene (PDA) was explored as the fluorescent and electrochemical biosensor applications. Self-assembly and photo-polymerization chemistry of diacetylenic monomers on reduced graphene oxide (RGO) for non-covalent functionalization were used for the high solubility and further functionality of graphene in water. The formation of PDA/RGO was characterized through the measurement of optical and structural properties using UV-Vis, FT-IR, Raman, and photoluminescence spectrometers. For the biosensing applications, PDA/RGO was further functionalized by biotin, and biotinlated PDA/RGO was detected in microfluidic biochip via biotin-straptavidin interaction. The electrochemical experiments showed the potential of functionalized RGO for use as an electrochemical biosensor, especially with the detection of an analyte at low concentration.