Synthesis and Electrochemical Performance of Polypyrrole/Graphene Nanocomposites for the Detection of Formaldehyde

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Polypyrrole/graphene nanocomposites have been synthesized via a simple *in-situ* pyrrole polymerization process. The polypyrrole/graphene nanocomposites were analyzed by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), high-resolution TEM (HRTEM) and Fourier transform infrared spectroscopy (FTIR) spectra. The results show that the sphere-like polypyrrole particles with the size of less than 500 nm attach to the surface of the graphene nanosheet-shaped structures with the size of less than 10 μm . The polypyrrole/graphene nanocomposites modified glassy carbon electrode exhibits good electro-catalytic performance for formaldehyde in neutral solution. The nanocomposites modified glassy carbon electrode shows an irreversible current peak located at +0.2 V. The detection limit and linear detection range are 0.028 μM and 0.001–2 mM. The polypyrrole/graphene nanocomposites reveal great potential to detect formaldehyde in liquid environment.

Keywords: Graphene/polypyrrole nanocomposites, Glassy carbon electrode, Electrochemical performance, Formaldehyde.

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