Electrochemical Sensor for Ultrasensitive Determination of Atorvastatin Based on Polypyrrole Functionalized Graphene Sheets

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In this study, polypyrrole functionalized graphene sheets (PPY-GNs) have been used for the first time as a reinforced material for the ultrasensitive detection of atorvastatin by the electrochemistry method. The obtained PPY-GNs were characterized by scanning electron microscopy (SEM) and Fourier transform infrared (FT-IR) spectroscopy. Due to its porous structure, the PPY-GNs-modified electrode has a large effective area, thereby improving the sensitivity of detection. The peak currents of atorvastatin at the GNs-modified glassy carbon electrode (GNs/GCE) and those at the PPY-GNs/GCE are increased dramatically compared to those on the bare GCE. The peak current at the PPY-GNs/GCE linearly increases with the increase in the atorvastatin concentration, which ranges from 20 μ M to 200 μ M. The detection limit of atorvastatin reaches 1.191 μ M based on the signal-to-noise characteristic ($S/N = 3$). The PPY-GNs-based electrochemical sensor was successfully used to detect atorvastatin in tablets with satisfactory results.

Keywords: polypyrrole functionalized graphene sheets; polypyrrole; atorvastatin; electrochemical sensor

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