Preparation of Platinum Decorated Laser-Induced Graphene Flexible Electrode and Its Application for Clenbuterol Detection

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The traditional preparation method of graphene is complicated in operation and high-cost, which severely limits the further application of graphene. Hence, a new strategy for the rapid, large-scale, low-cost preparation of graphene can effectively solve the current problems. In this work, laser-induced graphene (LIG) was rapidly prepared in one step based on polyimide (PI) film as the substrate, by using laser direct writing technology, and prepare LIG into a flexible electrode. Besides that, LIG flexible electrode was modified the by chemical method, sodium borohydride was used as reducing agent to reduce chloroplatinic acid, and Pt metal nanoparticles were loaded on the surface of LIG electrode in situ to prepare Pt-LIG composite electrode material. Compared with LIG electrode, Pt-LIG electrode has high conductivity, larger surface area and better electrocatalytic ability. It is used as a new type of electrochemical sensing platform to perform electrochemical detection of clenbuterol (CLB), obtaining a wide detection linear range of 0.1 – 820.9 μM , and a lower limit of detection (LOD) of 0.072 μM . Moreover, the CLB in the actual sample of beef was detected at the same time, and an effective and acceptable recovery rate was obtained.

Keywords: Laser-induced graphene; Pt nanoparticles; Flexible electrode; Electrochemical sensor; Clenbuterol.

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