N, S co-doped Graphene/Ag@Au Triangular Core-Shell Nanomaterials for Determination of Quercetin

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In the study, a hydrothermal method was used to prepare N, S co-doped graphene (NS-G) with graphenes oxide (GO) as raw material, L-cysteine (C₃H₇NO₂S) as sulfur source, nitrogen source and reductant. The atoms of N and S have been completely bonded to carbon atoms when the mass ratio of GO and L-cystein was 1:5. Then, the NS-G was impregnated with Ag@Au triangular core-shell nanomaterials (T-Ag@Au NPs) prepared by seed-mediated growth method to obtain N, S co-doped graphene/Ag@Au triangular core-shell nanomaterials (NS-G/T-Ag@Au NPs). The NS-G/T-Ag@Au NPs were dropped on glassy carbon electrode (GCE) to construct a novel modified electrode (NS-G/T-Ag@Au NPs/GCE) for sensing quercetin. The electrochemical sensor for quercetin determination exhibited excellent stability and sensitivity with a good linear range (0.5 μM -15.0 μM) and low the detection limits (5×10⁻⁸ M). The NS-G/T-Ag@Au NPs/GCE, in particular, was successfully applied for determination of quercetin in tea and honeysuckle samples with desirable recovery range (97.46-103.48 %) and relative standard deviation (RSD, 1.27-5.10 %).

Keywords: N, S co-doped graphene; T-Ag@Au NPs; Quercetin; Electrochemical sensor

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