Electrochemical determination of heavy metals using hybrid nanosheets of Au@rGO

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Abstract

Heavy metals (HMs) are considered crucial pollutants of the environment as they are very toxic, easy to be accumulated, and nondegradable in environment [1]. Therefore, the main goal of this study is to develop a graphene based sensor, suitable for the monitoring of Heavy Metals in environment. Herein, based on advantages of graphene oxide and metal nanoparticles, we used a single-step technique to produce reduced graphene oxide (rGO) conductive films integrating gold NPs. This method is based on the coreduction of graphene oxide and metal cations (Au^{3+}) by CO_2 laser plotter [2]. The production procedure has been optimized, and the obtained nanomaterials are fully characterized; the hybrid nanosheets have been easily transferred onto lab-made screen-printed electrodes [2]. The electrochemical characterization of integrated Au@rGO- sensor was accomplished via Cyclic Voltammetry (CV) and Square Wave Anodic Stripping Voltammetry (SWASV) as typical techniques for HMs dedection [3]. A well-visible shift of the lead reoxidation peak was observed in the case of modified sensor Au@rGO-. Based on obtained results, this sensor can be used for determination of Heavy Metals in environment.

References

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[3] Q. Yang,et al., ACS EST Water (2021), 1, 2470−2476

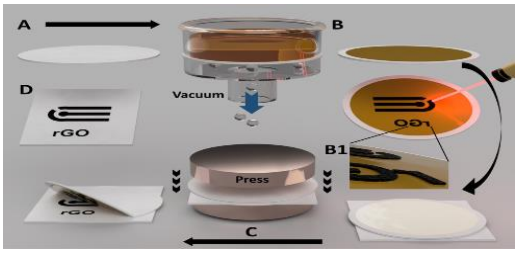

Figure 1: Schematic presentation of rGO-sensor

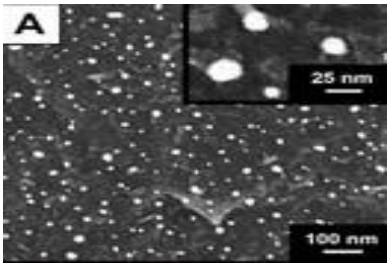

Figure 2: SEM of Au@rGO- films

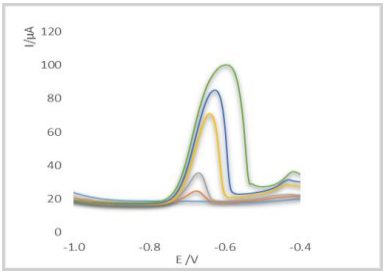

Figure 3: Typical SWASVs of Pb^{2+} using Au@rGO- sensor