Electrochemical determination of lead by laser -scripted reduced graphene oxide electrode decorated with gold nanoparticles

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Over the past decade, surface water sources have been continuously polluted by harmful chemical substances, biological waste, and other contaminants, primarily due to rapid industrialization and human activities.[1] Among them, heavy-metal ions(HMIs) are a huge threat as they are very toxic, easy to accumulate, and non-degradable in the environment. The presence of lead ions (Pb^{2+}) is associated with adverse effects on children's behavior, physical growth, cognitive skills, and educational achievement. [2] In this study, we present a graphene-based sensor for the detection of Pb^{2+} in water. The sensor utilizes a conductive film composed of reduced graphene oxide (rGO) incorporated with gold nanoparticles (AuNPs), fabricated through a one-step, CO_2 laser-assisted co-reduction process. This method simultaneously reduces graphene oxide and gold cations to form the rGO@Au nanocomposite [3] Electrochemical characterization of –rGO@Au sensor was accomplished via Cyclic Voltammetry and Square wave anodic stripping voltammetry. [4] The sensor exhibited a sensitivity of 0.3367 μA/ppb, a 5-30 ppb linear range, and a correlation coefficient of 0.9941.

References

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