Electrochemical Graphene-Based Immunosensor for Accurate Detection of Small Molecules

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Our research focuses on harnessing the unique properties of graphene-based nanomaterials and antibodies to develop enhanced immunosensor devices. We employ a sustainable, cost-effective, one-step printing and stamping method to fabricate nanostructured three-electrode electrochemical cells. This process involves the use of an infrared laser to precisely exfoliate and reduce graphene oxide (rGO), which can be transferred onto flexible substrates like PET to yield electrodes [1]. The working electrode is functionalized with monoclonal antibodies [2] or nanobodies to selectively capture and detect small molecules. Upon analyte binding to the immobilized antibodies, dose-dependent electrochemical signals are produced, enabling rapid and accurate detection of small molecules. This integration of nanomaterials, biosensors, and electrochemical techniques holds significant promise for rapid detection of small molecules in the field of healthcare and food safety.

References

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