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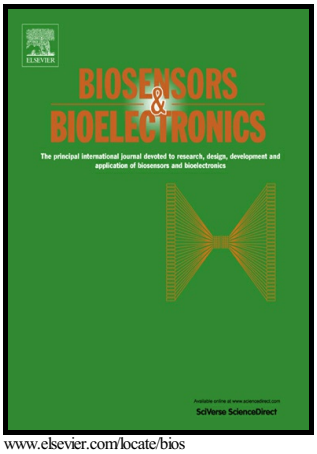

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Novel Porous Gold-Palladium Nanoalloy Network-supported Graphene as an Advanced Catalyst for Non-enzymatic Hydrogen Peroxide Sensing

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Abstract

In an effort to develop electrocatalysts associated with effective design, testing, and fabrication, novel porous gold-palladium nanoalloy network-supported graphene (AuPd@GR) nanohybrids were successfully synthesized via electroless deposition followed by a chemical vapor deposition (CVD) method for the first time. The AuPd@GR nanohybrids were obtained as a continuous, porous, transparent, bendable, and ultrathin film with good assembly of the AuPd nanoalloy particles (< 10 nm) within the GR. The AuPd@GR nanohybrids exhibited excellent catalytic activity towards H_2O_2 detection with a wide detection range (5 μM-11.5 mM), high sensitivity (186.86 $\mu A \cdot mM^{-1} \cdot cm^{-2}$), low limit of detection (1 μM), fast response (3 seconds), and long-term working stability (2,500 seconds). Furthermore, the AuPd@GR nanohybrids demonstrated outstanding durability, along with negligible interference from ascorbic acid, dopamine, uric acid, urea, potassium ions, chloride ions, and glucose. These findings open a new pathway to fabricate electrocatalysts for