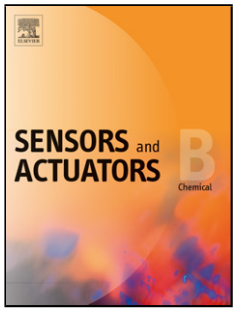

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A 3D sandwich structured hybrid of gold nanoparticles decorated MnO_2/graphene-carbon nanotubes as high performance H_2O_2 sensors

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Research Highlights

- A 3D sandwich structured AuNPs/MnO_2/GP-CNTs hybrid has been prepared using three steps.
- The priority of AuNPs/MnO_2/GP-CNTs hybrid to CNTs, GP-CNTs and MnO_2/GP-CNTs towards electrochemical responses of H_2O_2 was demonstrated.
- The as-prepared AuNPs/MnO_2/GP-CNTs hybrids showed excellent electrocatalytic activity towards H_2O_2 with ultrahigh detection sensitivity of 452 $\mu A\ mM^{-1}\ cm^{-2}$ and low detection limit of 0.1 μM.

Abstract: In this paper, a 3D sandwich structured hybrid of gold nanoparticles (AuNPs) decorated MnO_2/graphene (GP)-carbon nanotubes (CNTs) was prepared via three steps, and the resultant AuNPs/MnO_2/GP-CNTs hybrids was characterized by field-emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), energy-dispersive X-ray spectroscopy (EDX) detector and X-ray diffraction (XRD) spectrum, respectively. In this structure, the peeled GP nanosheets from CNTs work as linkers with CNTs to form 3D scaffold for facilitating fast electron conduction. The MnO_2 nanoparticles well distributed on the GP-CNTs