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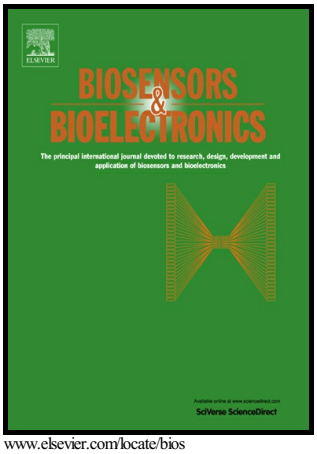

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ACCEPTED MANUSCRIPT

Ultrasensitive photoelectrochemical immunosensor for the detection of amyloid β-protein based on $SnO_2/SnS_2/Ag_2S$ nanocomposites

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Abstract

An ultrasensitive label-free photoelectrochemical (PEC) immunosensor with high visible-light activity was developed for quantitative detection of amyloid β-protein (Aβ) by cross-linking anti-Aβ antibody onto the Ag_2S sensitized SnO_2/SnS_2 nanocomposites. Specifically, SnO_2 with flower-like porous nanostructure was innovatively applied in PEC immunosensor as a basal material. It could form a heterostructure with SnS_2, which brought about the sensitization of SnO_2 and enhanced the separation of photogenerated electrons and holes. Moreover, Ag_2S was in-situ growth on the surface of SnO_2/SnS_2, which further enhanced the photocurrent response significantly. Therefore, $SnO_2/SnS_2/Ag_2S$ could form stepwise band-edge structure, which benefited the light harvesting and provided a good foundation for sensor construction and detection. Under optimal conditions, the PEC immunosensor was used to detect the content of Aβ and exhibited a wide linear concentration range

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