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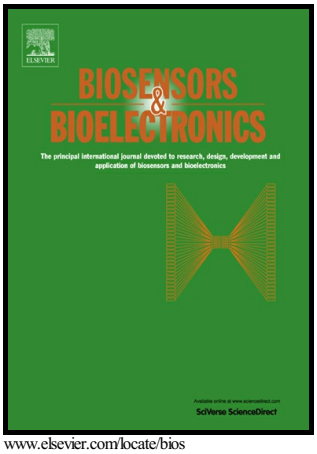

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High visible light sensitive MoS_2 ultrathin nanosheets for photoelectrochemical biosensing

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Abstract

For the purpose of effectively utilizing the visible light, photoelectrochemical (PEC) detection represents a unique detection signal and different energy form of the excitation source. In this work, ultrathin MoS_2 nanosheets with narrow band gap were successfully fabricated by a facile C_3N_4 sacrificial template assisted thermolytical approach. Upon immobilizing glucose oxidase, excellent photocatalytic activity towards glucose is achieved in neutral buffer solution. As a novel visible light sensitive photocatalytic material, ultrathin MoS_2 nanosheets present a detection limit of ~0.61 nM, which is much lower than those with the similar configurations reported previously. Based on the excellent anti-interference property, the feasibility of applying the proposed sensor to determine glucose in human serum is further demonstrated. This work provides new insight into the fabrication of promising visible light sensitive two-dimensional layered transition-metal chalcogenides nanostructures for construction of photoelectrochemical biosensors.

Keywords