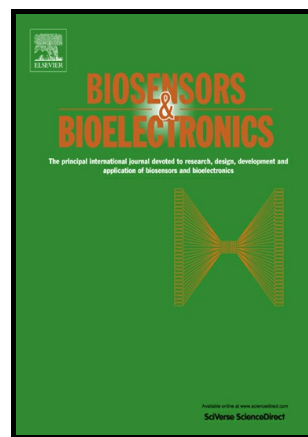


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Principles and applications of photoelectrochemical sensing strategies based on biofunctionalized nanostructures

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Abstract

Photoelectrochemical (PEC) biosensing is a popular research hotspot that has attracted substantial attention from chemists and biologists due to its low cost and desirable sensitivity. The PEC biosensing mainly refers to the influence of the interaction between recognition element and analyte on photocurrent signal, which involves the charge and energy transfer of PEC reaction between electron donor/acceptor and photoactive material upon light irradiation. Understanding the fundamentals of PEC strategy benefits the development of next-generation PEC sensors. However, the research on detection mechanism of PEC sensors is in the initial stage and need to be further exploited. Thus, with a particular focus on the signal transduction formats, this review highlights the novel concept on PEC sensing strategies, and categorizes the recent illustrative examples into three signaling principles: reactant determinant, electron transfer and energy transfer, providing the comprehensive design guidelines for researchers to develop more advanced PEC sensors. The prospects and challenges for future work are also included.

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