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Electrically nanowired-enzymes for probe modification and sensor fabrication

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Abstract

Enzymes are highly specific and selective due to their precise, intricate three-dimensional catalytic- structure. Electron transfer in enzymes normally occurs through an active-metal centers or tunneling events that are highly insulated by the surrounding globular protein structure. In case of electrochemically active enzymes/proteins, the distance between the redox-active cofactor and the electrode surface plays key role during direct communication. Therefore, the long electron-tunneling distance can be overcome by introducing mobile redox mediators such as nanostructures specially nanowires which can diffuse into and out of the enzyme active site, ferrying reducing or oxidizing equivalents with them. Therefore, nanowire-conjugated enzymes have gained great interest in the development of biosensor devices and other electrocatalytic-biological applications. Herein we present a comprehensive review about the electrochemical enzyme-based sensor using nanowires. Over the past decade, nanowires were investigated as a versatile platform for various applications including sensors and biosensors because of their high aspect ratio and a high surface-to-volume ratio. This review aimed to summarize

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