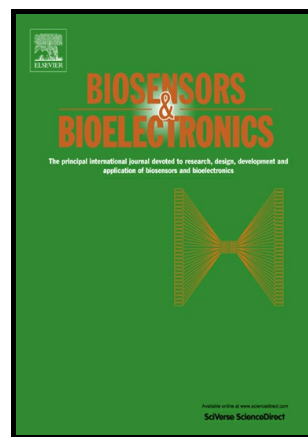


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Beyond graphene: electrochemical sensors and biosensors for biomarkers detection

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Abstract

Graphene's success has stimulated great interest and research in the synthesis and characterization of graphene-like 2D materials, single and few-atom-thick layers of van der Waals materials, which show fascinating and technologically useful properties. This review presents an overview of recent electrochemical sensors and biosensors based on graphene and on graphene-like 2D materials for biomarkers detection. Initially, we will outline different electrochemical sensors and biosensors based on chemically derived graphene, including graphene oxide and reduced graphene oxide, properly functionalized for improved performances and we will discuss the various strategies to prepare graphene modified electrodes. Successively, we present electrochemical sensors and biosensors based on graphene-like 2D materials, such as boron nitride (BN), graphite-carbon nitride (g-C₃N₄), transition metal dichalcogenides (TMDs), transition metal oxides and graphane, outlining how the new modified 2D nanomaterials will improve the electrochemical performances. Finally, we will compare the results obtained with different sensors and biosensors for the detection of important biomarkers such as glucose, hydrogen peroxide and cancer biomarkers and highlight the advantages and disadvantages of the use of graphene and graphene-like 2D materials in different sensing platforms.

Abbreviations

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