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Recent developments in recognition elements for chemical sensors and biosensors

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HIGHLIGHTS

- We discuss developments on recognition elements in chemical sensors and biosensors
- We report on classical recognition elements, such as enzymes and antibodies
- We report on recent recognition elements, such as aptamers and phages

ABSTRACT

Recognition elements, also known as target receptors, are important parts of chemical sensors and biosensors since they are responsible for the recognition of target analytes of interest. Although recent recognition elements were synthesized in the laboratory or selected *in vitro*, their combination with nanomaterials also aroused the interest of researchers due to improvements in the analytical performance of chemical sensors and biosensors as a consequence of the enhanced properties of such nanostructures. This review discusses recent developments in recognition elements, both classical, such as enzymes and antibodies, and recent, such as aptamers and phages, integrated into chemical sensors and biosensors the food, clinical and environmental fields.

Keywords:

Analytical performance

Antibody

Aptamer

Biosensor

Chemical sensor

Enzyme

Molecularly-imprinted polymer

Nanomaterial

Phage

Recognition element

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1. Introduction

The recognition mechanism is crucial in chemical sensing and biosensing and improvements in recognition elements, for example, through incorporation of nanomaterials, can greatly enhanced the analytical performance of chemical sensors and biosensors, particularly selectivity. According to the International Union of Pure and Applied Chemistry, a chemical sensor is “a device that transforms chemical information, ranging from the concentration of a specific sample component to total composition analysis, into an analytically useful signal. The chemical information, mentioned above, may originate from a

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