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Biosensing based on pencil graphite electrodes

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Abstract

Pencil leads have been increasingly used as electrode material in electrochemical applications. Commonly denominated as pencil graphite electrodes (PGE), they represent a viable alternative to other standard electrodes due to their comparable electrical properties but mainly for their low cost and availability, enabling disposable applications. In order to achieve the best analytical performance literature evidences the type of lead (hardness level) and electrode surface pre-treatment are critical to the envisaged application. The present review describes the use of PGE in biosensing analysis, more specifically those sensors comprising immobilized enzymes but also briefly referring nucleic acids and other biological entities. It lays an emphasis in the immobilization process of the biological entities while focusing in the analytical performance of each biosensor, mainly sensitivity, linear range and limit of detection as comparative criteria. This review also addresses the main characteristics and properties of PGEs as transducer material in the electrochemical field.

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