Recent advances of Molecularly Imprinted Polymers: Strategies for Electrochemical Methods on Pharmaceutical Analysis

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Molecular imprinting technology, which forms molecularly imprinted polymers (MIPs), is a creative method that enables synthetic biorecognition gaps to imitate real biological derivatives like antibodies, receptors, enzymes, etc. [1]. After removing the target analyte, synthetic cavities enable the recognition and selective rebinding of the template. Although stable and durable MIPs seem relatively easy to create to achieve maximum efficiency, some optimization parameters should be considered, such as appropriate functional monomer and crosslinker and optimal ratios between functional monomer, template, and crosslinker [2]. In addition, the structure of the polymeric matrices and the type of bond contact between the template and the polymer are two important factors in MIPs [3]. The unique feature of superior selectivity of MIPs enables them to be used in various fields. Among them, MIP-based electrochemical sensors have a significant place because, with MIPs, it is possible to overcome the lack of selectivity issue in electrochemical sensors.

MIP-based electrochemical sensors and miniature electrochemical transducers can detect target analytes in situ. Thanks to superior chemical and physical stability, low-cost manufacturing, high selectivity, and fast response, MIPs have become an interesting field recently [4]. The studies on electrochemical MIP-based sensors to identify pharmaceuticals, heavy metals, hormones, enzymes, and biomarkers have grown. Moreover, without requiring time-consuming preparation procedures, these sensors have been successfully used in biological fluids (serum and urine samples) and pharmaceutical samples.

References

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