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Isothermal exponential amplification techniques: from basic principles to applications in electrochemical biosensors

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ABSTRACT

As a conventional amplification technique, polymerase chain reaction (PCR) has been widely applied to detect a variety of analytes with exponential amplification efficiency. However, the requirement of thermocycling procedures largely limits the application of PCR-based methods. Alternatively, several isothermal amplification techniques have been developed since the early 1990s. In particular, according to the reaction kinetics, isothermal exponential amplification techniques possess higher amplification efficiency and detection sensitivity. The isothermal exponential amplification techniques can be mainly divided into two categories: enzyme-based isothermal exponential amplification and enzyme-free isothermal exponential amplification. Considering the advantages of high sensitivity and selectivity, high signal-to-noise ratio, low cost

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