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A chemiluminescence biosensor for the detection of thrombin based on the aptamer composites

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Abstract

An efficient, rapid, simple and ultrasensitive chemiluminescence (CL) approach was proposed for thrombin detection based on the aptamer-thrombin recognition. The aptamer composites were synthesized in this work using graphene oxide (GO) as the backing material. The thrombin was adsorbed on the aptamer composites based on the aptamer-thrombin recognition. Thus, thrombin could be quantified by the difference value of the CL intensity between supernate of the sample and the mixture which composed of thrombin and coexisted substances. The CL intensity exhibits a stable response to thrombin over a concentration range from 2.5×10^{-10} to 1×10^{-9} mol \cdot L $^{-1}$ with a detection limit as low as 8.3×10^{-11} mol \cdot L $^{-1}$, the relative standard deviation (RSD) was found to be 4.9% for 11 determinations of 1.25×10^{-9} mol \cdot L $^{-1}$ thrombin. Finally, the applicability of the method was verified by applying to serum samples. The recoveries were in the range of 90.3-101.0% with RSD of 2.6-3.2%.

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