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Graphitic C₃N₄ nanosheet and hemin/G-quadruplex DNAzyme-based label-free chemiluminescence aptasensing for biomarkers

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Abstract

Here we first reported that graphitic carbon nitride nanosheet (g-C₃N₄ NS) could effectively quench the chemiluminescence (CL) of luminol-hydrogen peroxide (H₂O₂) system. According to the new discovery, a label-free and homogeneous CL aptasensing platform was designed for sensitive detecting of biomarkers. In the absence of target, DNA probe containing hemin/G-quadruplex DNAzyme structure was adsorbed on the surface of g-C₃N₄ NS, causing the CL quenching of luminol through an electron transfer process. However, in the presence of the target, a DNA-DNA duplex was formed due to DNA hybridization reaction and target recognition effect, which could not be adsorbed onto the g-C₃N₄ NS surface because of its weak affinity. Thus, the electron transfer was blocked and the CL emission of luminol could be enhanced. The proposed CL aptasensor could detect carcinoembryonic

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