
A Sandwiched Immunosensor for Highly Selective and Sensitive Detection of Alpha-fetoprotein with Electrochemiluminent Probes

Yanfei Shen^{*†1} and Pan Deng¹

¹Medical School, Southeast University – China

Abstract

An ultrasensitive sandwich-typed electrochemiluminescence (ECL) biosensor for the analysis of Alpha-fetoprotein (AFP) antigen was fabricated based on CdTe doped Silica nanoparticles doped carboxylated graphene (CdTe@SiO₂/GO) nanocomposites as carrier to immobilize labeled AFP antibody and Chitosan/MWCTs composite as carrier to immobilize capture AFP antibody. High ECL signal could be obtained since the luminant CdTe@SiO₂/GO could produce a large number of the emission photons. Because of its good conductivity and high surface area, the CS/MWCTs composite material, on one hand, accelerated the electron transfer rate on the electrode surface. On the other hand, it improved the loading rate of capture antibody and labeled antibody, thus further obtaining the high ECL intensity and improving the sensitivity of the sensor. The as-obtained biosensor exhibited a linear range from 1.0 pg/ml to 100 ng/mL with a detection limit of 0.22 pg/mL (at an S/N ratio of 3). This proposed assay would provide a simple highly sensitive and selective approach for AFP detection and be applicable to be extended to other tumor marker sensing.

References

M. Zhu, M. Li, G.H. Li, Z.K. Zhou, H. Liu, H.T. Lei, Y.F. Shen, Y.K. Wan, *Microchim Acta*, **182**, 2451-2459 (2015).

G.H. Li, M. Zhu, L. Ma, J.R. Yan, X.L. Lu, Y.F. Shen, Y.K. Wan, *ACS Appl. Mater. Interfaces*, **8**, 13830-13839 (2016).

Q. Zhou, G.H. Li, Y.J. Zhang, M. Zhu, Y.K. Wan, Y.F. Shen, *Anal. Chem.*, **88**, 9830-9836 (2016).

Keywords: electrochemiluminescence, biosensor, CdTe@SiO₂, immunosensing, tumor marker

*Speaker

†Corresponding author: Yanfei.Shen@seu.edu.cn