

t-Butyl End-functionalized Salicylaldimine Propylenimine Tetraamine Cobalto-Dendrimer-Modified Gold Electrode as DNA Biosensor Platform

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We report a novel cobalt first generation (G1) salicylaldimine propylenimine tetraamine dendrimer possessing terminal *t*-butyl groups as a promising multifunctional immobilisation layer in amperometric DNA biosensors. A model DNA biosensor (Au//Co-G1Dendrimer//NH₂-ODN) was developed by drop coating an organic solvent solution of this cobalt-dendrimer on gold disk electrode and then over-immobilizing an NH₂-end functionalized 21-mer oligonucleotide probes. Voltammetric studies were performed in pH 7.4 phosphate buffer saline with or without the ferro/ferricyanide couple ([Fe(CN)₆]^{3-/4-}). We recently reported that the Co-G1Dendrimer film-modified glassy carbon electrode exhibited electrochemical activity¹. Square wave voltammetry of the Au//Co-G1Dendrimer//NH₂-ODN also indicated reversible redox peaks at a formal potential of 184 mV (vs Ag/AgCl). After hybridization (incubation period of 1 hour) with the complementary target ODN, the SWV voltammogram showed not only increase in peak heights but also equal anodic shifts (about 30 mV) in both anodic and cathodic peaks potentials but still remained reversible. The UV-visible absorption peak of the Co-G1Dendrimer in acetone was monitored in the absence and presence of target ODN and both target and probe ODNs to collect supporting information. Results from these and additional electrochemical studies on the biosensor will be presented as well as a description of its analytical performance.

Keywords: Cobalt, DNA biosensor, salicylaldimine propylenimine tetraamine dendrimer, dendrimer, modified electrode

1. J. Martinovic et al., *ElectrochimicaActa* (2007), doi:10.1016/j.electacta.2008.02.013