526d Glucose Sensors Based on Redox Polymer/Enzyme/Carbon Nanotube Multilayers

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In this study, we describe the construction of glucose biosensors based on an electrostaticlayer-by-layer technique. Gold electrodes were initially functionalized with negatively charged 11-mercaptoundecanoic acid (MUA), followed by alternate immersion in solutions of a positively charged redox polymer, poly[(vinylpyridine)Os(bipyridyl)2Cl2+/3+] and a negatively charged enzyme, glucose oxidase (GOX). When the glucose oxidase solution contained single-walled carbon nanotubes (SWNTs) the oxidation and reduction peak currents during cyclic voltammetry increased 1.5-6.5 times depending upon the number of layers deposited. Similarly the glucose electro-oxidation current also increased 5-17 times. Thus, the incorporation of SWNTs can be used in glucose biosensor construction to increase the sensor's electrical response.