

481e A Novel Ferrocene-Modified Poly(Ethylenimine) Redox Polymer for Biosensor Applications

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A novel redox polymer based on the covalent attachment of ferrocene to linear poly(ethyleneimine) was prepared. Cyclic voltammetry of crosslinked and non-crosslinked films of the polymer (LPEI-Fc) showed that there was electronic communication between neighboring ferrocene centers which became pronounced when the polymer was crosslinked. When glucose oxidase was immobilized in crosslinked films, the LPEI-Fc polymer was able to function as an electron relaying “wire” mediating electron transfer from the FAD center of glucose oxidase to an electrode surface. The biosensors had limiting current densities of $340 \pm 40 \text{ } \mu\text{A}/\text{cm}^2$ in response to glucose and an apparent K_m of $6.0 \pm 0.7 \text{ mM}$. The redox polymer developed here could also be useful in the development of immunosensors, fuel cells, and DNA sensors.