

Immobilization of glucose oxidase on carbon nanotubes by non-covalent functionalization

민경선, 유영제*
서울대학교 화학생물공학부
(yjyoo@snu.ac.kr*)

The glucose oxidase, widely used for the determination of glucose in body fluids for diabetic diagnosis, was selected as a model enzyme and immobilized onto carbon nanotubes(CNTs). CNT is one of the most promising immobilization support offering large surface area and good electrical conductivity for application in the fields of biosensor and enzymatic biofuel-cell. For covalent binding between glucose oxidase and CNTs, suitable functional groups must be introduced on the surface of CNTs. In this research, CNTs were non-covalently functionalized by 1-pyrenebutyric acid to overcome the problem of defect sites are broken parts of the bond by acidic oxidation and consequently lose their unique electrical property. The maximum amount of glucose oxidase was obtained by introducing covalent bonds between enzyme and CNTs. The amount of immobilized glucose oxidase was 1mg /mg CNT. The details including an immobilization mechanism, a long-term stability, and potential for biosensor and enzymatic biofuel cell will be presented.