Immobilization of laccase in Biofuel cells by Sol–Gels and Carbon Nanotubes

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Abstract

Aim and Background: *Nowadays demands for clean power source is highly enhanced. Bio-fuel cell (BFC) can convert chemical energy to electrical energy. The enzyme-based bio fuelcells (BFC) is a special fuel cell using enzyme as catalyst and can directly convert chemical energy to electrical energy. Bio-fuel cells are energy conversion devices based on bio- electrocatalysis leveraging on enzymes or microorganisms.*

Materials and Methods: *In the present paper, Sol-gel is used to laccase Encapsulation and immobilization on the electrode. Mediator is immobilized into porous silicate–carbon heterogeneous structure of carbon ceramic electrode (CCE). In the next step, laccase is immobilized in hydrophilic silicate thin film deposited on the ABTS modified CCE (ABTS-CCE) surface. ABTS polymer is located in sol-gel function as the mediator for the electron transfer.*

Results: *Cyclic voltammetric results indicate low electron transfer rate because of weak contact between enzyme and electrode surface while maximum redox pick achived in 10 micro amper in a solution containing 15 micro molar o-dianisidin as substrate.*

Conclusion: *By using of carbon nanotubes connection were improved and maximum redox pick achived in 14 micro amper in the same concentration.*

Key Words: *Biofuel cells; Laccase Immobilization; Carbon Nanotubes; sol-gel.*

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