

## Development of novel 3-dimensional composite electrode for enzymatic biofuel cell application

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

Recently, the composite of nanoscaled material and biomolecules is of great interest in the field of biotechnology. It is well known that SWNTs(single wall carbon nanotubes) have been one of the immobilization supports offering large surface area and good electrical conductivity. And glucose oxidase(GOx) has been widely used enzyme in biosensor and biofuel cell. Especially there are two critical issues to be solved before enzymatic biofuel cell become competitive in practical application; short life time and poor power density. To overcome these issues, novel 3-dimensional GOx-SWNTs-Ppy(polypyrrole) composite was developed, optimized, and characterized as electrode for enzymatic biofuel cell application. This composite electrode was prepared from chemically polymerized polypyrrole with glucose oxidase immobilized SWNTs and characterized by scanning electron microscopy. The electrochemical performance of this composite electrode was investigated by cyclic voltammetry. This glucose/O<sub>2</sub> enzyme fuel cell was composed by this composite electrode, Pt wire, and Ag/AgCl. The maximum power output was about 1.2 mW/cm<sup>3</sup> in 5mM glucose solution at 0.49V.