

## A novel mixed buffer system for an electrolyte of enzyme-based biofuel cell

의진영, 장은지, 신현용, 김승욱\*

고려대학교

(kimsu@korea.ac.kr\*)

Environment-friendly bioelectrical cells such as minimized biofuel cell may prove to be attractive alternative energy supply sources for nano-microelectronic devices and biosensors. Enzyme-based biofuel cells (EFCs) are capable of functioning at moderate temperatures, and biocatalysts have proven to be useful in biofuel cells for facilitating the transfer of electrons. However, electrical biocatalysts have a low activity and electrical power. For increasing electrical properties of biocatalyst a novel mixed buffer (phosphate and 3-morpholinopropanesulfonic acid (MOPS)) system was applied to an enzyme-based biofuel cell with microperoxidase (MP-11)-modified Au electrode. The cathodic electrical properties were increased by the phosphate and MOPS-mixed buffer solution. It was identified that the novel mixed buffer system obtained stronger ionic strength from phosphate buffer and better enzyme activity from MOPS buffer. The highest results of cyclic voltammetry were obtained when the proportion of phosphate to MOPS was nearly 1:1 and the pH was 7.0~7.3. In addition, the novel mixed buffer led to the maximum power density (ca. 62.7  $\mu\text{W}/\text{cm}^2$ ) in a basic enzymatic fuel cell (EFC).