Enhancement of enzymatic fuel cell by a development of cobalt coating in mediator

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The bioelectrode for enzymatic fuel cell was developed by composites of cobalt chloride (CoCl2) and graphite oxide (GO) as adsorbents of cobalt (Co) at ambient conditions. Surface properties of developed bioelectrode were investigated by Fourier Transform Infrared spectroscopy (FTIR), Transmission Electron Microscope (TEM), Scanning Electron Microscope (SEM), Energy Dispersive X-ray Spectroscopy (EDX), potentionetric titration, and thermal analysis at the initial and exhausted conditions. The result indicated that adsorptive capacity of Co for bioelectrode was significantly influenced by CoCl2 concentration. The adsorptive cobalt and -OH of GO/Co composites, as an important functional groups, were performed onto electrodes of enzymatic fuel cell. After assembly of electron transfer mediator (Go/Co composites), glucose oxidase and laccase were immobilized onto electron transfer mediator. Performance of cell potential and power density of enzymatic fuel cell was evaluated as availability of electron transfer mediator with various Co coating concentration. The maximum power density (1,050 μW/cm2) was successfully obtained with 2.0 M CoCl2.