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Nanoparticulate Copper Oxide, Manganese Oxide, and Cobalt Oxide Synthesized by Solution Combustion Technique for Glucose Detection

Enzymeless glucose detectors offer advantages in terms of temperature and humidity stability, as well as elimination of toxic chemicals usage. Various metal oxide materials are capable of exhibiting glucose catalysis activities. This research, therefore, aimed at developing nanoparticulate oxides for enzymeless glucose sensor applications. Copper oxide (CuO), manganese oxide (Mn2O3) and cobalt oxide (Co3O4) powders with sizes ranging from 30 to 90 nanometers were successfully synthesized by solution combustion technique and embedded into multi-walled carbon nanotubes (MWCNT). Electrocatalytic activities of the metal oxides/MWCNT in glucose solutions with concentration ranging from 0.1 to 10 mM were examined by cyclic voltammetry technique. Electrical signals with sensitivity in the range of 10-2 A/ (mM cm2) were observed. The results suggested potential implementation of CuO, Mn2O3 and Co3O4 in enzymeless glucose sensor applications.

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