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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.

Primary author: Dr JONGPRATEEP, Oratai (Department of Material Engineering Kasetsart University)

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