Synthesis of Cu2O/CuO Nanomaterials for Enzymeless Amperometric Detection of Glucose

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A one-pot approach has been developed for the preparation of Cu2O nanocubes from cupric nitrate in alkaline aqueous solutions containing fructose and ascorbic acid at 32 degrees clesius. In the presence of cetyltrimethylammonium bromide, Cu2O nanocubes and Cu2+ ions react to form Cu2O/CuO nanomaterials. Relative to Cu2O nanocubes, Cu2O/CuO nanomaterials possess higher electrocatalytic activity for glucose oxidation. The enzymeless Cu2O/CuO electrode allows sensitive detection of glucose, with linearity of the current at 0.6 V vs. Ag/AgCl against glucose concentration over the range of 0-5 mM (R2 = 0.99). The Cu2O/CuO nanomaterial modified electrode has been validated by determination of the concentrations of glucose in serum samples, with a result that is not significantly different from that obtained by a commercial glucose device. We have found that the stable and low-cost electrode can be used for at least 60 cycles of cyclic voltammetry measurements.

Awards Won:

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