Fully nozzle-jet printed non-enzymatic electrode for biosensing application

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The progress in developing electrochemical sensors for biomolecule detection requires a facile device fabrication technique. Herein, we report printing of silver (Ag) precursor and copper oxide nanoparticles (CuO NPs) inks by nozzle-jet technique to fabricated non-enzymatic glucose biosensor on flexible polyethylene terephthalate (PET) substrate. The fully printed CuO NPs/Ag/PET electrodes were characterized using electrochemical technique for non-enzymatic biosensing of glucose. The fully printed biosensor exhibited a high sensitivity (1424.2 $\mu AmM^{-1}cm^{-2}$), linear range from 0.1 to 15 mM, low detection limit (0.3 μM; S/N=3) and fast response time of ~2 seconds under a working potential of + 0.6 V. Additionally printed electrodes demonstrated an excellent long term stability, high reproducibility, good selectivity and high accuracy during glucose concentration measurements in human blood and serum samples. These results indicate that the electrode fabrication using nozzle-jet printing can be regarded as a potential technique for the future development of high performance and low cost bio/chemical sensor devices.