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Anodes for glucose fuel cells made of carbonized nanofibers with embedded carbon nanotubes SABINA PRILUTSKY, YACHIN COHEN, EYAL ZUSSMAN, VADIM MAKAROV, Technion, Israel, EUGENIA BUBIS, PINCHAS SCHECHNER, ORT Braude College, Israel — Electrodes made of carbonized polyacrylonitryle nanofibers, with and without embedded multiwall carbon nanotubes (MWCNT) were fabricated by the electrospinning (ES) process and evaluated as anodes in a glucose fuel cell (FC). The effect of several processing and structural characteristics, such as the presence of MWCNTs, polymer concentration in the ES solution and silver electroless plating, on FC performance were measured The carbon electrodes were successful as anodes showing significant activity even without additional silver catalyst, with noticeable improvement by incorporation of MWCNTs. The orientation of graphitic layers along the fiber axis and the coherence of layer packing were shown to be important for enhanced electrode activity. The maximal values of open circuit voltage (OCV) and peak of power density (PP_D) of unmetallized electrodes, 0.4 V and 30 $\mu W/cm^2$, were found for composite carbon nanofiber electrode. Electroless silver metallization leads to enhanced performance. Maximal values of OCV and PP_D of silvered electrodes were measured to be about 0.9 V and 400 $\mu W/cm^2$. Thus, carbonized nanofibers with embedded MWCNTs may form a good basis for glucose FC anodes, but better metallization and cell-configuration allowing proper mixing are required.

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