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Electrospray Deposition and Characterization of Single-Walled Carbon Nanotube Thin Films

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Single-walled carbon nanotubes are one among the most promising carbonaceous materials to be used as the electrodes in the devices like micro batteries, supercapacitors, etc. In this study, single-walled carbon nanotube thin films have been fabricated through electrospray deposition technique which is one of the attractive direct printing methods in the field of printed electronics. Single-walled carbon nanotube ink (water dispersed, 3wt %) has been used to fabricate thin films through electrospray deposition technique. The as-deposited SWCNT thin films have been characterized using the appropriate characterization techniques and the results are presented.

Keywords: SWNT, ESD, SEM

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Binder-free and Full Electrical-Addressing Free-standing Nanosheets with Carbon Nanotube Fabrics for Electrochemical Applications

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As the old saying ‘nothing is complete unless you put it in final shape’, although nanosheets (NSs) are a promising functional building block for various electrochemical applications, their true value cannot be realized until they are well woven into electrical conducting materials. As an effort to determine their ideal shape, in this study, a unique manufacturing route to build a layer-by-layer (LBL) structure of two-dimensionally ordered, free-standing β-nickel hydroxide nanosheets (β-NHNSs) that are fully electrically addressed with single-wall carbon nanotube fabrics was demonstrated, and its capabilities were verified through a comparative study on the differences between a simple bulky and LBL-structured electrochemical cathode, representing two extreme cases. The LBL-structured cathode showed a discharging current peak that was 25 times larger than the bulky structured one measured in cyclic voltammetry, which implies that the LBL structure is near an ideal electrode configuration for NS-based electrochemical applications.

Keywords: Nanosheets, Carbon nanotube, Electrochemical, Layer-by-layer