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The Synthesis of Copper Nanowire with high aspect ratio by capping agent for textile electronics

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Recently, new types of wearable devices such as textile electronics are considered as the next generation wearable electronics. To realize the textile electronics, conductive fibers are required to supply the power and for signal processing. Conventionally, silver nanowires (Ag NWs) have been attracted as one of the conductive additives in the fibers, however, using the Ag NWs may lead to high production cost since it is a noble metal. Many researches have been done to replace the Ag NWs into a cheaper materials such as copper nanowires (Cu NWs). Here, we synthesized ultra-long Cu NWs for a conductive filler material in conductive fibers, taking advantages of their structural features. To investigate the effect of capping agents on the aspect ratio of the synthesized Cu NWs, we used various capping agents such as hexadecylamine, butylamine, ethylenedilamine and oleylamine in the Cu NW synthesis. In this research, the effects of capping agents on the structure and the synthesis of Cu NWs are presented.

Keywords: CuNW, Nanowire

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Characterization of Ni Oxide Nanofibers by Electrospinning

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The Ni oxide/PVP nanofibers were synthesized by sol-gel and electrospinning technique. The obtained Ni oxide/PVP (polyvinylpyrrolidone) nanofibers were calcined to remove the PVP compound at 873 and 1173 K. The Ni oxide/PVP nanofibers were analyzed by scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS). The SEM images showed that the mat form was prepared by calcination of Ni oxide/PVP nanofibers at 873 K. And the crystal structure of Ni oxide at 1173 K was also confirmed by SEM images. XRD results shows the crystallinity of metallic Ni and NiO. TEM images also verified the crystal phase of Ni and Ni oxide. XP spectra revealed that the oxidation state of Ni to conclude the chemical composition of Cu oxide nanofibers.

Keywords: Ni oxide nanofibers, electrospinning