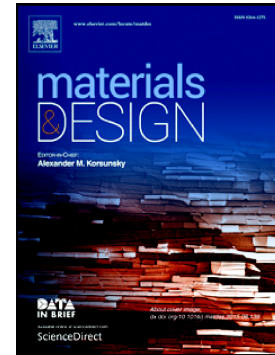


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Control of copper nanowire network properties and application to transparent conducting layer in LED

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Abstract

We report the control of structural, optical, and electrical properties of solution processed copper (Cu) nanowires (NWs) by varying the capping agent concentration and demonstrating the enhanced light extraction of GaN-based light-emitting diodes (LEDs) using Cu NWs. Cu NWs were prepared by a simple solvothermal method, and the capping agent concentration effects on the growth of Cu NWs were systematically investigated. The different diameters of Cu NWs were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), UV-visible absorption, and conductivity measurements. All characterization results showed high aspect ratio nanowires with efficient transmittance and conductivity properties. When the synthesized Cu NWs were adopted as a transparent conducting layer, the electroluminescence intensity was improved by its spreading effects. This work will elucidate the influence of capping agents on the physical properties, optical properties, and electrical conductivity of Cu NWs for use as a transparent conductor in optoelectronic devices.

Keywords: Copper nanowire, Capping agent, Transparent conductor, Light emitting diode

† Authors equally contributed to this work.

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