

Aqueous synthesis of copper nanowires using polyethyleneimine

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In a typical procedure, polyethyleneimine (PEI), as a capping agent, was added and coordinated with Cu (II) to form a complex of Cu (II)/PEI. The copper nanowires were synthesized by reacting Cu (II)/PEI and L-ascorbic acid (L-aa) at 80 °C for 3 hours. The experimental conditions including reaction temperature, molar ration of PEI/Cu and L-aa/Cu, and pH of the reacting solution were found to be important factors in the formation, reaction time, and aspect ratio of the copper nanowires. Scanning electron microscope (SEM) and transmission electron microscopy (TEM) results revealed that copper nanowires with an average diameter of around 200 nm and lengths of longer than 100 μm were synthesized. X-ray diffraction analysis confirmed the formation of face-centered cubic (FCC) metallic copper.