

An Aqueous-Phase Synthesis of Long Copper Nanowires

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This work describes a simple and aqueous-phase route for synthesis of Cu nanowires (Cu NWs) having a long length of 140–180 μm , a high aspect ratio of more than 350, and long-term stability. High-quality Cu NWs were synthesized by reduction of CuCl_2 with ascorbic acid in the presence of branched polyethyleneimine (BPEI) in an aqueous solution at 90 °C. The synthesized uniform Cu NWs showed long-term stability without the formation of Cu oxides on the surface of the NWs after being stored at room temperature for 40 days. Interestingly, we found that Cl^- in the reacting solution played a key role in the formation of long Cu NWs. We also investigated the influence of various experimental conditions including the weight ratio of BPEI/ CuCl_2 , the pH of the reacting solution, and the reaction temperature on the length, morphology, and stability of Cu NWs.