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Polyol synthesis of ultrathin and high-aspect-ratio Ag nanowires for transparent conductive films

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Abstract

Ultrathin Ag nanowires (AgNWs) with a high aspect ratio of over 1300 were synthesized through NaCl and KBr-mediated polyol reaction. AgNWs became thinner and longer with the increase in NaCl concentration, whereas Ag nanoparticles were formed without NaCl. When 0.4 mM of KBr was added, the diameter of the AgNWs decreased further to 20-50 nm and its length increased to 30-60 μm . The appropriate mixture of metal salts was crucial in synthesizing ultrathin and long AgNWs. Transparent conductive films of AgNWs yielded excellent properties with a sheet electrical resistance of 25 Ω/sq and a visible-light transmittance of over 90%.

Keywords: Ag nanowires; polyol; transparent conductive films

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