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Nanoparticles and thin films of silver from complexes of derivatives of N-(diisopropylthiophosphoryl) thioureas

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Abstract

The derivatives of JV-(diisopropylthiophosphoryl)thiourea $RC(S)NHP(S)(OiPr)_2$ ($R = C_5H_{11}N$, $C_5H_6N_2$ or $C_{10}H_7NH_2$) followed by their complexation with silver are reported. All complexes are decomposed in hot hexadecylamine (HDA) to give HDA-capped silver nanoparticles. The absorption spectra of the HDA-capped silver nanoparticles exhibit surface plasmon resonance (SPR) absorption in the 400-420 nm region. Transmission electron microscopy (TEM) images of all particles are close to spherical in shape; with sizes ranging from 17 to 20 nm. The X-ray diffraction (XRD) patterns of the silver nanoparticles obtained from all three complexes could be indexed to face centered cubic silver. Scanning electron microscopy (SEM) image confirmed the spherical shape of the particles. The silver complex of 1-naphthylamine was also used to deposit thin films of silver by the aerosol-assisted chemical vapor deposition (AACVD). © 2009 American Chemical Society.

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