

Fabrication of Long CdS Nanowires by Using a Chemical Solution Process

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A skein of thread-like cadmium sulfide (CdS) semiconductor nanowires has been successfully fabricated using a high-temperature (360 °C) multiple-injection solution-phase process in a mixture of trioctylphosphine oxide (TOPO), trioctylphosphine (TOP) and n-tetradecylphosphonic acid (TDPA) ligands. The injection method of the sulfide precursor and the holding time were varied and found to be crucial to the fabrication of the long CdS nanowires. The CdS nanowires, with widths of 2.5 nm, formed extended networks over microns long, giving then a skein-type bundle-of-nanowires structure. In addition, we have demonstrated the growth of gold (Au) nanoparticles on the CdS nanowires. The CdS nanowires were characterized by s-ray diffraction (XRD), thermogravimetry-differential thermal analysis (TG-DTA), high resolution transmission electron microscopy (HRTEM), X-ray photoelectron spectrometer (XPS) and UV-photoluminescence (PL) spectra.

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