Characterization of GaP Nanowires Synthesized by Chemical Vapor Deposition

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Abstract

The synthesis of GaP nanowire has attracted much attention because of their extraordinary optical, electrical, and mechanical properties. The gallium phosphide(GaP) nanowires can promise many applications to electronic, optoelectronic, and magneto-optical devices. Nevertheless, there were rare reports on the synthesis of GaP nanowires compared with gallium nitride (GaN) nanowires or zinc oxide (ZnO) nanowires.
We report synthesis and specific core-shell structure of GaP nanowires by a simple vapor deposition method, in which the mixture source of Ga and GaP powders was directly vaporized in the range of 800-1000℃ under argon ambient in a furnace.
We demonstrate that the metal-oxide nanoparticles and synthesis temperatures play a key roll in the growth of GaP nanowires and the mixture of Ga and GaP powder could act as an ideal source for the high-yield GaP nanowires with a single-crystalline structure. The wire-like products observed on the substrate are almost exclusively slightly curved nanowires with random orientation. The nanowires have diameters in the range of 30-100 nm and lengths up to several hundreds of micrometers.