

Synthesis and Characterization of Tungsten Oxide Nanowires

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Nanowires are very attractive for the high integrated nanoelectronics as well nanomachine applications, showing very unique low dimensional quantum physics and thus intensively studied by the various synthesis methods. Especially, tungsten oxide nanowires have been studied due to many interesting properties such as superconductivity, electrochromic property, and piezoelectricity. We report the synthesis of tungsten oxide nanowires by simple thermal chemical vapor deposition in this paper. Single crystalline tungsten oxide nanowires were grown by reaction of tungsten oxide (WO_3) powder and graphite with argon ambient in a 1000–1100°C horizontal tube furnace. To evaluate the structure and composition of nanowires, we performed EDX, TEM, HRTEM, SAED and XRD analysis. EDX analysis indicated that the nanowires are composed of W and O elements. XRD pattern and SAED confirmed that tungsten oxide nanowires have cubic structure. We also observed that tungsten oxide nanowires have a rod-like morphology with diameter of 20–50nm and length of 1–6 μ m using TEM. The unidirectional growth of tungsten oxide nanowires was clearly shown in the HRTEM image. The optical property of tungsten oxide nanowires was examined by Photoluminescence Spectrometer.