Zinc oxide due to specific electrical, optical and acoustic properties is the important semiconductor material, which has many various applications. One-dimensional solids like nanowires are potential materials for future nanoscale sensors and actuators. There is growing interest in ZnO nanowires due to its potential applicability for optoelectronic devices such as light-emitting diodes, laser diodes and detectors for UV wavelength range.

We grow single-crystal ZnO nanowires using the vapor transport method. The nanowires were characterized using scanning electron microscopy (SEM) and high-resolution transmission electron microscopy (HRTEM). Several different morphologies of the ZnO nanowires, including branched wire growth, were observed and a possible growth mechanism was discussed.

The emission properties of the ZnO nanowires with different sizes were studied. Two emission bands were observed, one being an exciton emission band in the UV and the other a broad emission band in the visible.

Keywords: Semiconductors, Nanowires, ZnO, Luminescence