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Synthesis and Raman Scattering from DMS Zn1-xMnxS Nanowires JIAN WU, HUMBERTO GUTIERREZ, PETER EKLUND, Department of Physics, Pennsylvania State University — Diluted Magnetic Semiconductor (DMS) have attracted a lot of attention in the field of Spintronics. Here, we report on our progress to grow DMS Zn1-xMnxS ($0 \leq x < 0.6$) nanowires using the vapor-liquid-solid growth mechanism and CVD source techniques based on sublimation of ZnS and MnCl2 powder. Ar/H2 carrier gas was passed over ZnS and MnCl2 maintained at specific temperatures to control the Zn/Mn ratio in the stream. The Zn/Mn concentration also is found to determine the structure, i.e., wurtzite vs zinc blende. HRTEM measurements show that the nanowires are single crystal and the composition was determined by EDS. Raman scattering was performed to study the vibrational properties of these nanowires vs. x. With increasing x, the TO band disappears quickly and cannot be observed; the LO band, however, is found insensitive to x. Between the TO and LO bands, there are three additional peaks appear. Two bands associated with zone edge modes (LA branch) are observed; one upshifts and the other downshifts with x. When possible, our Raman data on nanowires will be compared to that of the bulk.

Jian Wu

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