Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Characterization of β-Ga_2O_3 nanowires and their application in CO gas sensors MONSHU HO, TZU-FENG WENG, Department of Physics, National Chung Hsing University — Monoclinic gallium oxide (β-Ga2O3) is an important semiconductor material with a wide band gap of Eg 4.9 eV at room temperature (RT) and high chemical and thermal stability. This makes β-Ga2O3 an ideal material for gas sensors, phosphors, transparent conductors, and transparent electronic devices. This paper reports on the fabrication of high-density single crystalline β-Ga2O3 nanowires on silicon (100) and sapphire (0001) substrates using a vapor-liquid-solid growth method. The morphology of as-grown β-Ga2O3 nanowires was investigated using field emission scanning electron microscopy (FESEM). The diameter of the 1D nanostructures ranged from tens to a few hundreds of nanometers. X-ray diffraction (XRD) and field emission transmission electron microscopy (FETEM) confirmed the single crystalline monoclinic structure of the β-Ga2O3 nanowires. Multiple-networked CO gas sensors fabricated using the proposed β-Ga2O3 nanowires achieved remarkably sensitivity of 2158 ppm CO gas at room temperature. We also compared the CO gas sensing properties of multiple- networked bare β-Ga2O3 nanowires with those of Au-functionalized β-Ga2O3 nanowires at room temperature.

Monshu Ho
Department of Physics, National Chung Hsing University

Date submitted: 04 Nov 2016 Electronic form version 1.4