Supporting Information:

Simultaneous Growth of Pure Hyperbranched Zn_3As_2 Structures and Long Ga_2O_3 Nanowires

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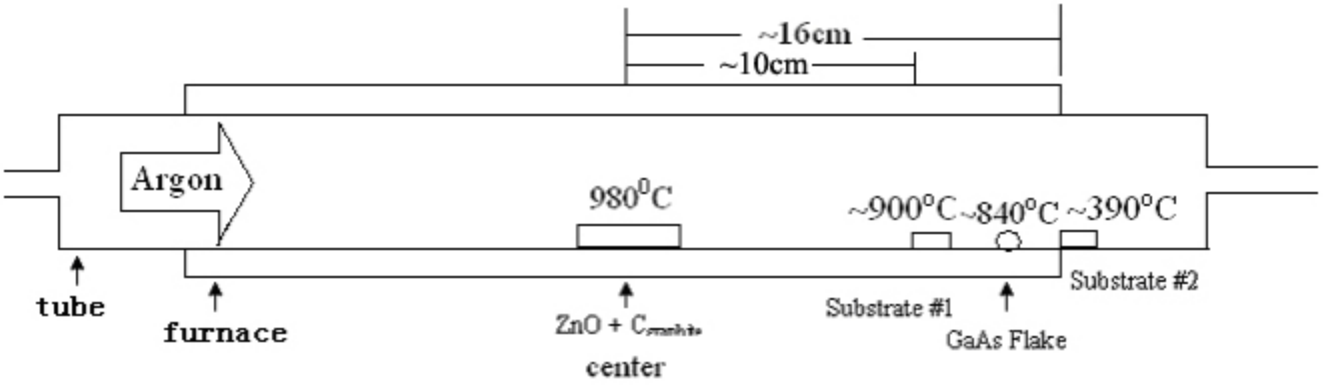

Figure S1. Schematic of the growth system for the Zn_3As_2 structures and Ga_2O_3 nanowires.

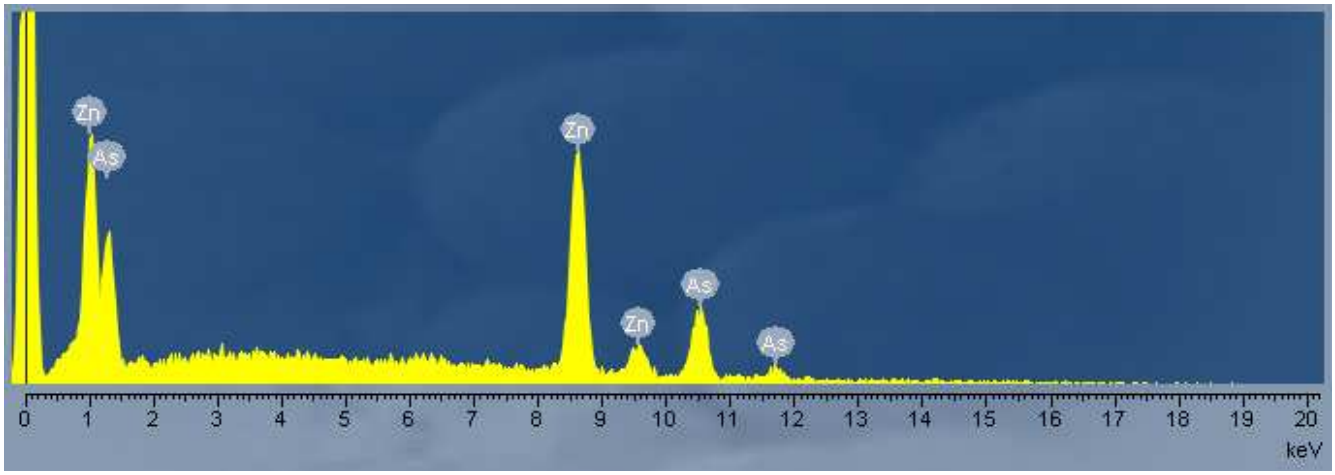

Figure S2 EDX spectrum of a hyperdendritic Zn_3As_2 structures.

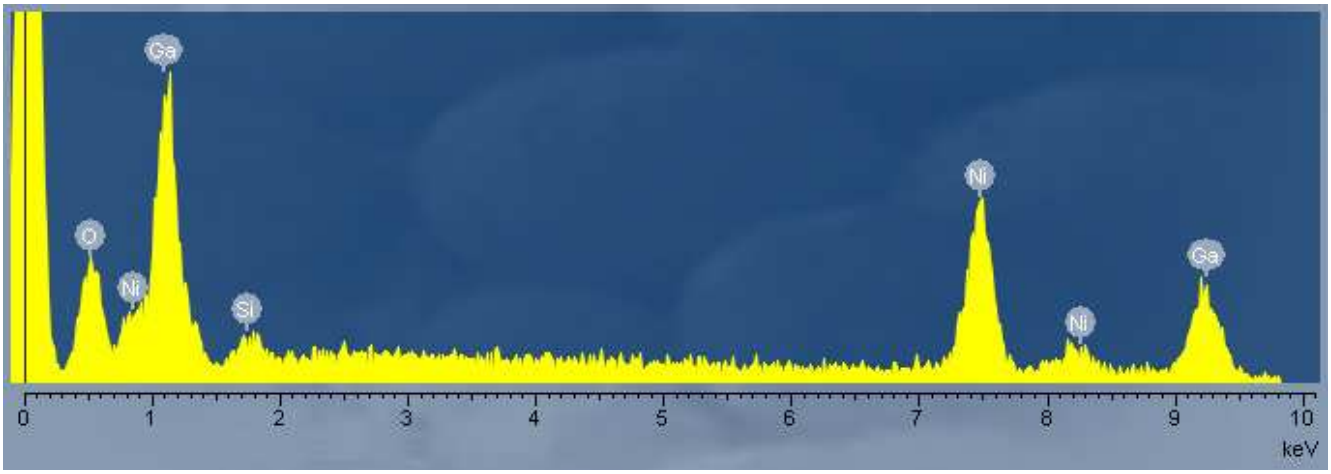

Figure S3 EDX spectrum taken from a catalyst tip at a Ga_2O_3 nanowire end.

Device fabrication and measurement:

The devices for electrical measurement were fabricated by an e-beam lithographic technique and the procedure is described as follows. First, suspensions of the as-grown nanowires were formed in isopropanol by ultrasoundic agitation. The suspensions were dispersed on n-type silicon wafers with a 1μm-thick thermal oxide (Silicon Quest) that had been pretreated with hot piranha solution, a mixture of 1 part concentrated hydrogen peroxide and 2 parts concentrated H_2SO_4. Polymethylmethacrylate (PMMA) resist layers were spin-coated on the nanowires- dispersed wafers, and contact patterns were defined on the resist layers by electron irradiation carried out in a SEM (FEI Quanta 600F). The patterns were developed with a mixture of 1:3 methyl isobutyl ketone (MIBK)/isopropanol. After development, Ti/Au metal films were evaporated on the resist and final pattern formation was accomplished by lift-off in $C_2H_2Cl_2$/acetone. The devices were imaged before electrical measurement to ensure that only one nanowire was between two metal contacts. Electrical transport measurements were performed at room temperature on a home-built probe station. The probe station consisted of a Bausch & Lomb MicroZoom II microscope, Rucker & Kolls Model 222 XYZ manipulators with 25 μm probe tips, and a Keithley 273 source-meter controlled by an Agilent VEE Pro program through the IEEE 488 bus.

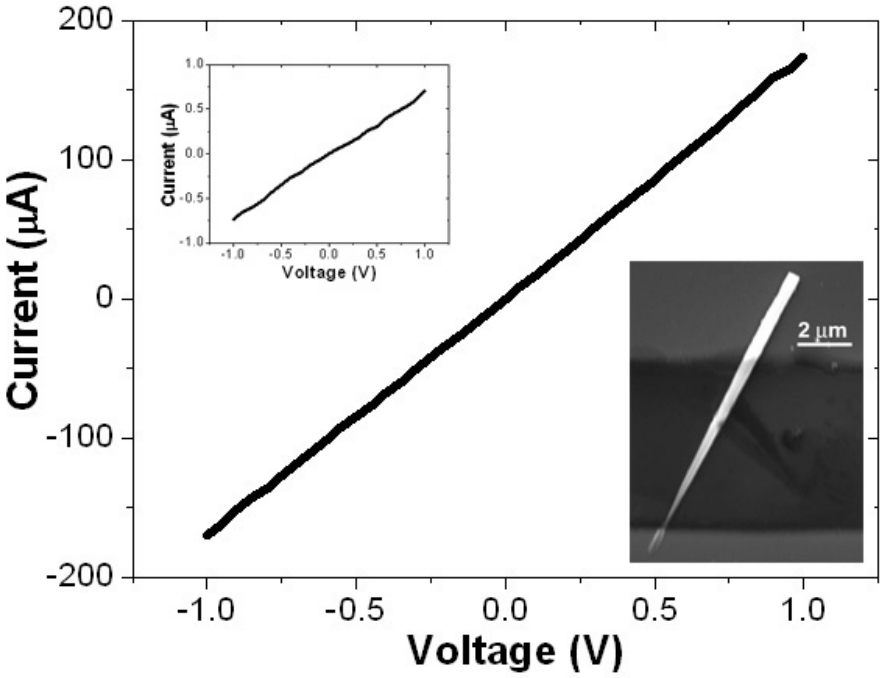

Figure S4. Room temperature transport measurements on an individual cone-shaped Zn_3As_2 nanowire device and the curve displays a linear *I-V* behavior. (Inset right) FESEM image of the Zn_3As_2 nanowire device. (Inset left) room temperature I-V behavior of an individual ZnO nanowire device; the ZnO nanowire's diameter is 170 nm and the nanowire's length between two metal contacts is 7 μm.

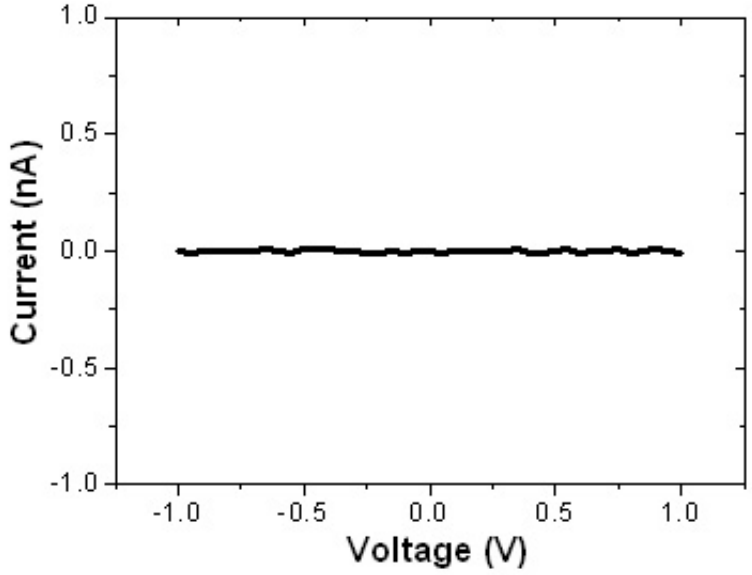

Figure S5. Room temperature transport properties of an individual β-Ga_2O_3 nanowire device.