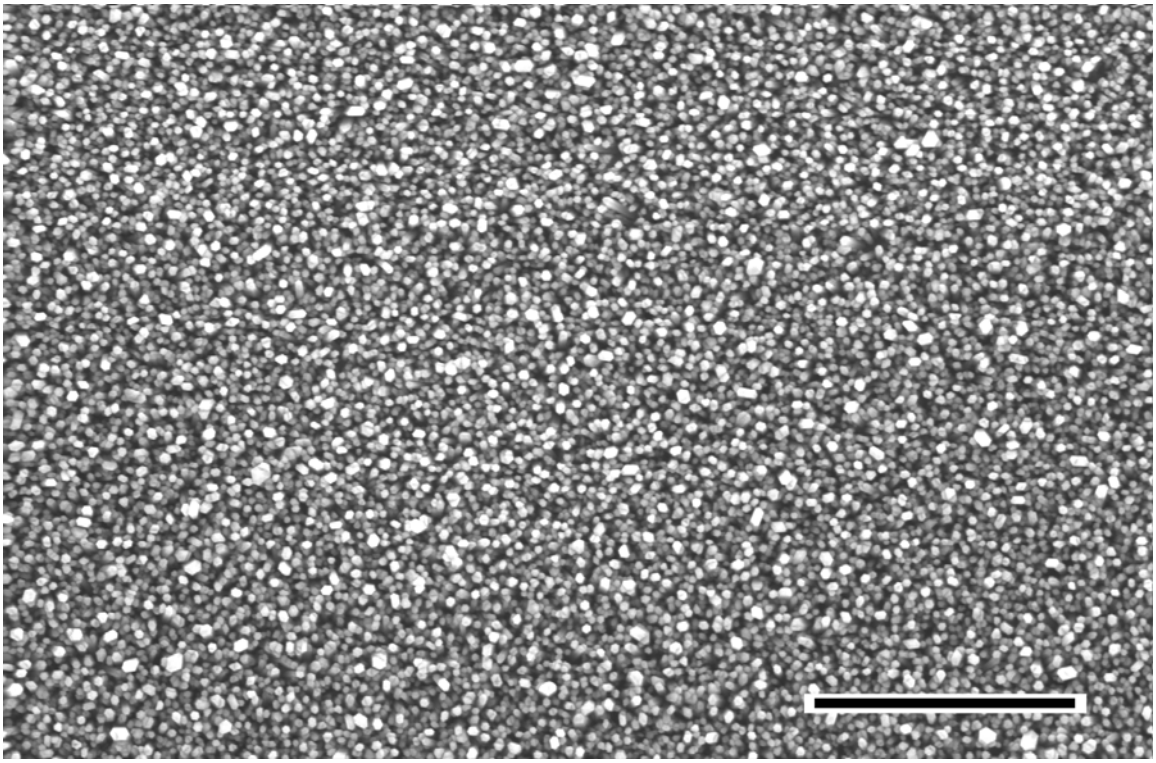
Supporting Information:

General route to vertical ZnO nanowire arrays using textured ZnO seeds

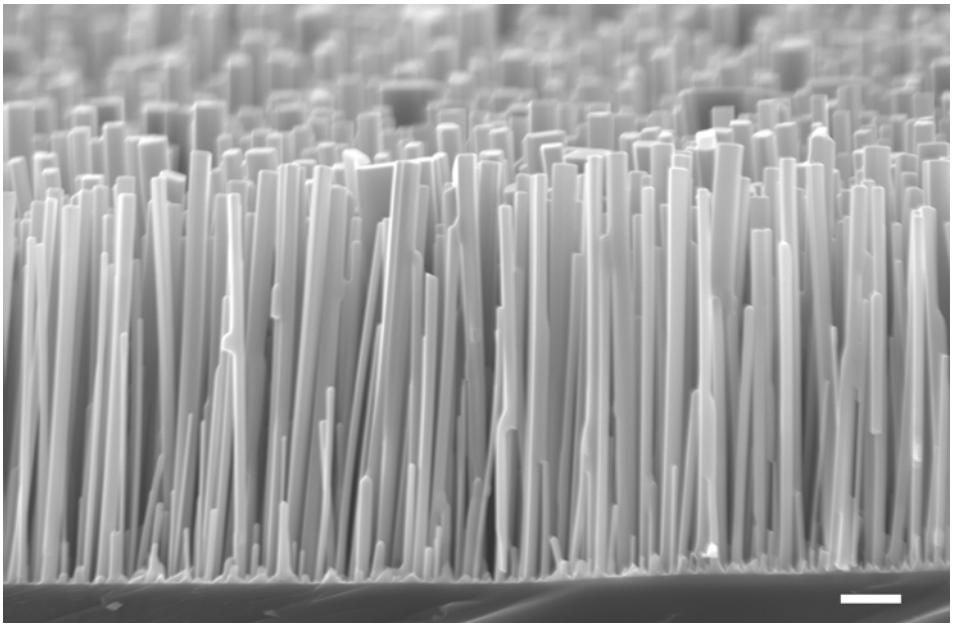
Lori E. Greene,[†] Matt Law,[†,‡] Dawud H. Tan,[†] Max Montano,[†,‡] Josh Goldberger,[†] Gabor Somorjai,[†,‡] Peidong Yang[,†,‡]*

Supporting Figure 1



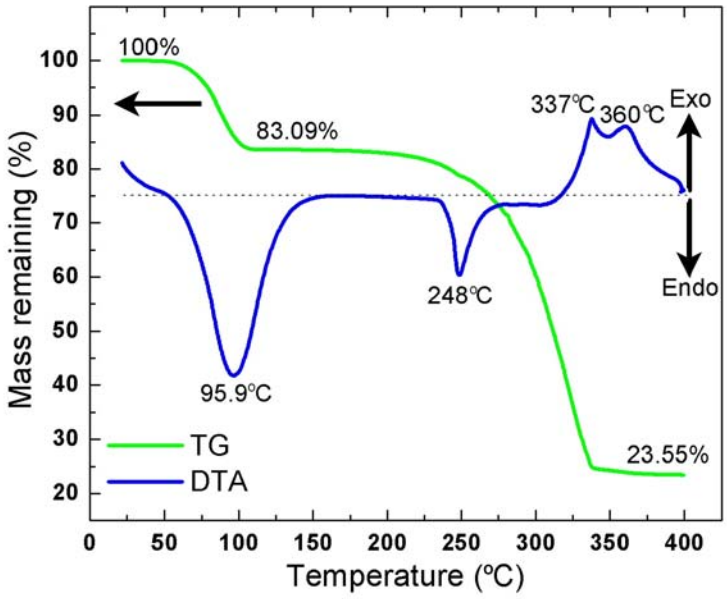
Supporting Figure 1. Plan view SEM image of a ZnO nanorod array on conductive glass grown from acetate-derived seeds in aqueous solution at 90°C. The nanowire number density averages 50 billion per square centimeter. The average interwire separation is approximately 25 nm. Scale bar, one micron.

Supporting Figure 2



Supporting Figure 2. Cross sectional view of a ZnO nanowire array grown from acetate-derived seeds using the gas-phase VLS synthesis. Scale bar, one micron.

Supporting Figure 3

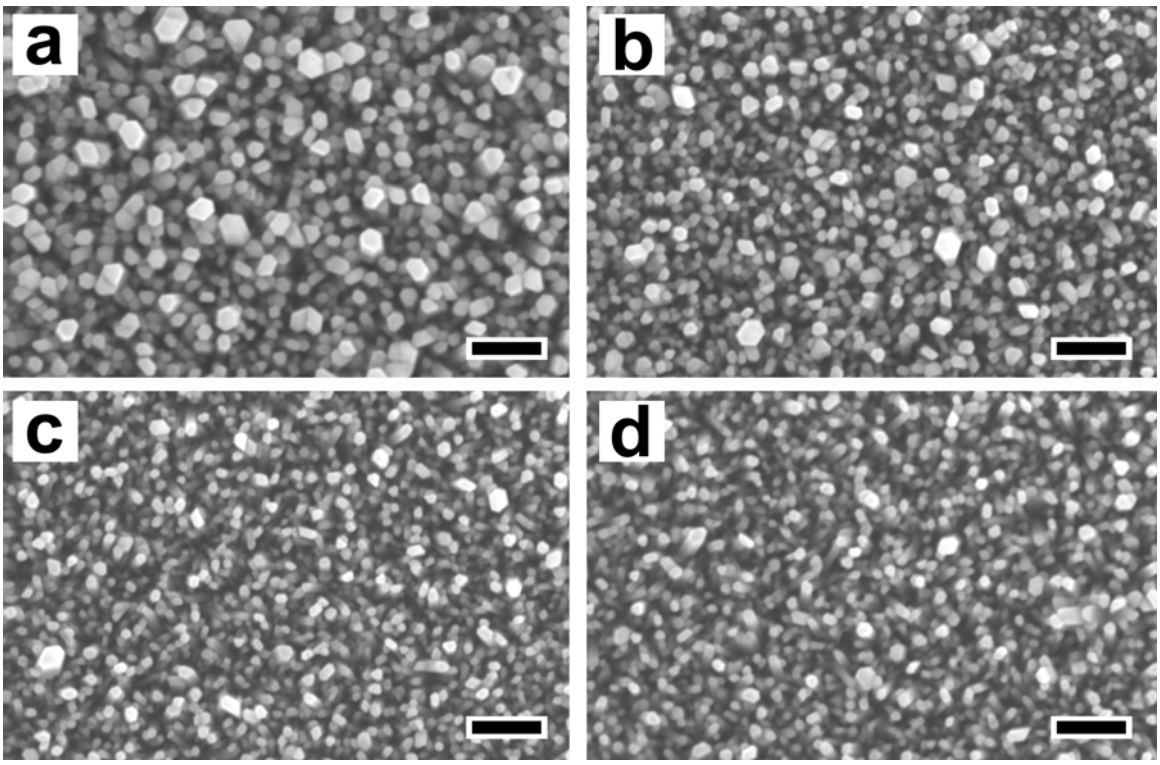


Supporting Figure 3. Thermogravimetry (TG) and differential thermal analysis (DTA) results for zinc acetate dihydrate. The first endothermic peak and mass loss correspond to the evaporation of the waters of crystallization. The anhydrous solid begins to sublime at ~175°C and then melts at ~250°C. The precise onset of decomposition to ZnO (with loss of acetic acid, acetic anhydride and other organics) is masked by the continuous evaporation of liquid zinc acetate above its melting point, but is not higher than 275°C. The mass loss is nearly complete by 335°C; we assign the two exothermic peaks above this temperature to the combustion of residual organics and/or the crystallization of amorphous ZnO. The final product was confirmed to be wurtzite ZnO by XRD. This scan was performed in flowing O_2 ambient (100 sccm) at a ramp rate of 10°C min^{-1}.

See also:

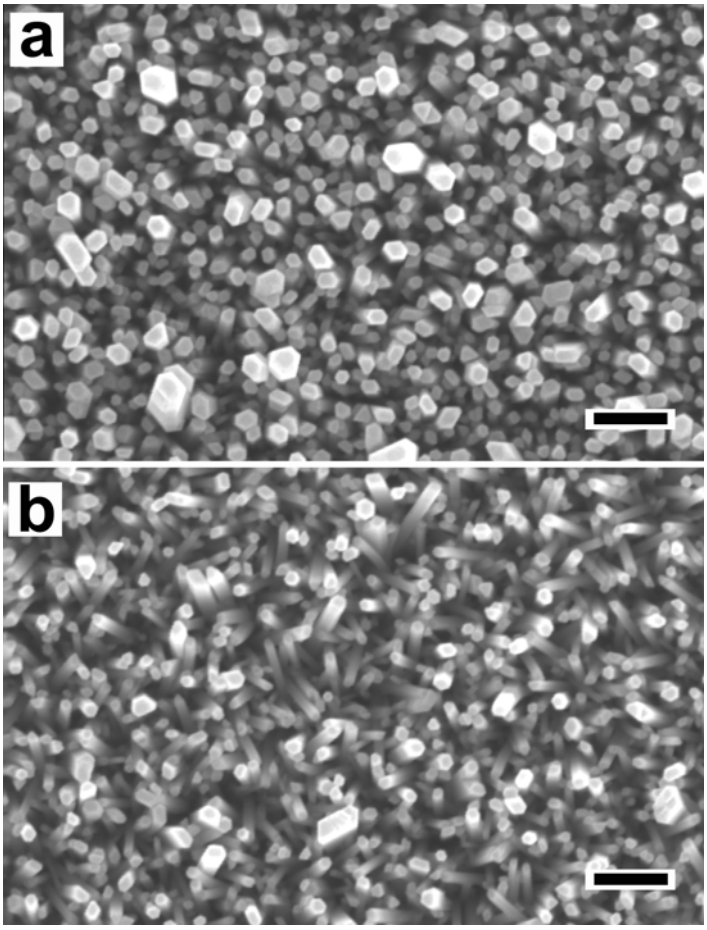
(1) Zhao, X.; Zheng, B.; Li, C.; Gu, H. *Powder Technology* **1998**, *100*, 20 – 23.

Supporting Figure 4



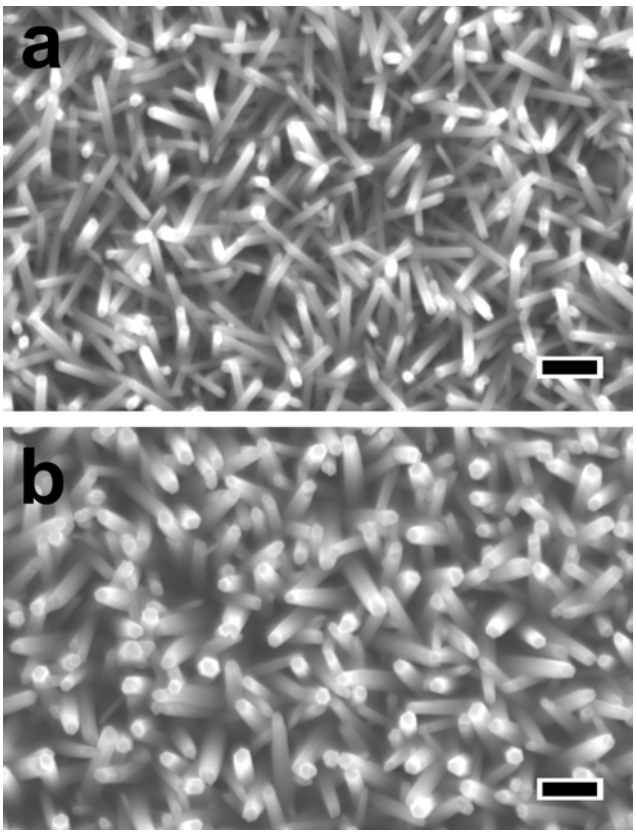
Supporting Figure 4. Nanorod arrays grown from acetate-derived seeds prepared at (a) 350ºC, (b) 300ºC, (c) 250ºC and (d) 200ºC. The rods remain vertical but decrease in diameter with lower preparation temperatures. All four arrays consist of rods 300 – 375 nm in length. Scale bar, 200 nm.

Supporting Figure 5



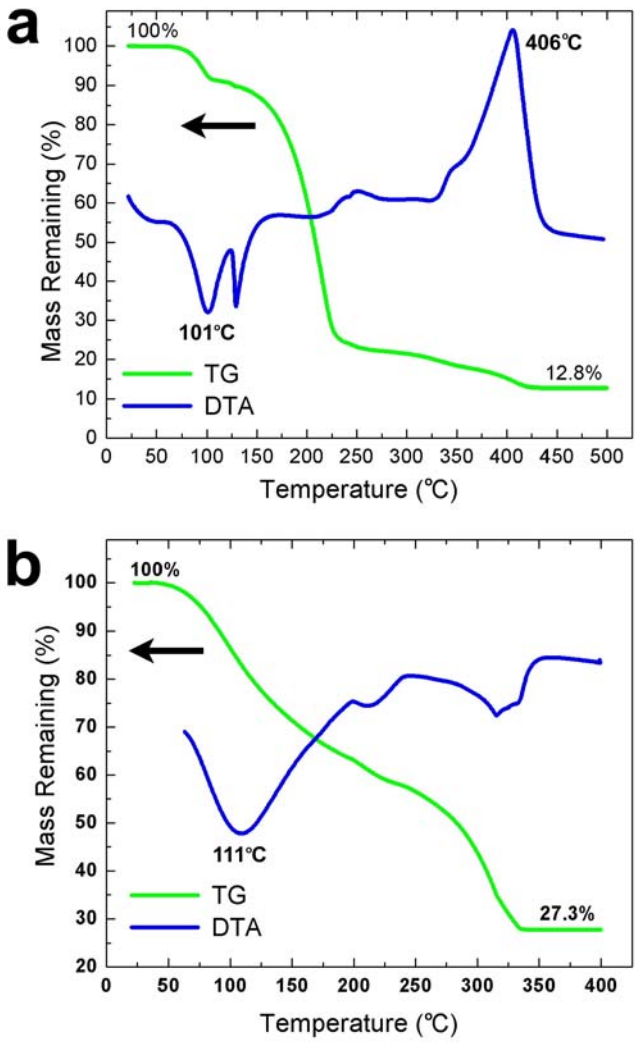
Supporting Figure 5. Nanorod arrays grown from acetate-derived seeds prepared at (a) 350ºC and (b) 150ºC. The low-temperature preparation results in thin, poorly aligned nanorods. Both arrays consist of rods 550 – 675 nm in length. Scale bars, 200 nm.

Supporting Figure 6



Supporting Figure 6. Nanorod arrays grown from seeds prepared by the decomposition of (a) zinc acetylacetonate and (b) zinc nitrate hexahydrate at 350ºC. Scale bars, 200 nm.

Supporting Figure 7



Supporting Figure 7. Thermal analysis of (a) zinc acetylacetonate monohydrate and (b) zinc nitrate hexahydrate. XRD confirmed that both compounds partially decompose to crystalline ZnO by 200ºC. These scans were performed in flowing O_2 ambient (100 sccm) at a ramp rate of 10°C min^{-1}.