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Supporting Information for:

Tuning the lateral density of ZnO nanowire arrays and its application as physical templates for radial nanowire heterostructures

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1. Experimental procedure in Ref. 30 for growth of high-density ZnO nanowires

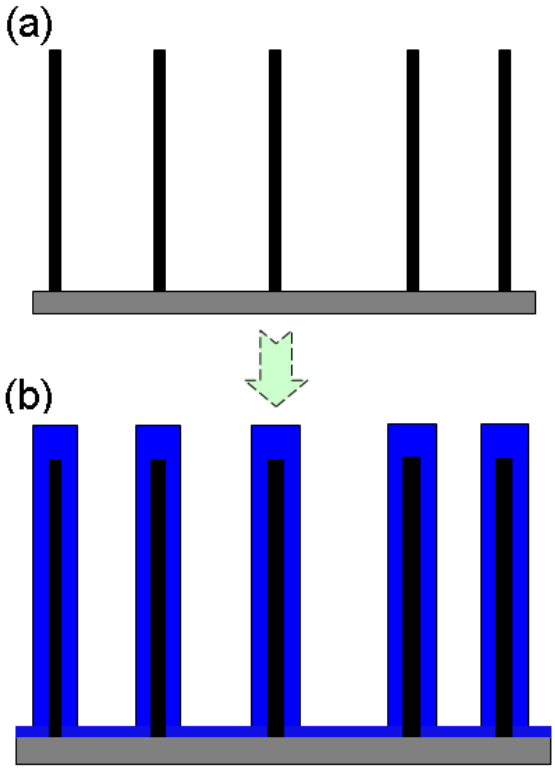
   High-density ZnO nanowires were grown with a high-pressure PLD chamber using a T-shape quartz tube with an outer diameter of 30 mm. A KrF excimer laser beam enters along the center bar of the T and is focused on the cylindrical surface of the rotating targets, The targets were pressed and sintered from 5N ZnO powders. Usually, 12 000–48 000 laser pulses with 3–10 Hz repetition frequency were applied for one growth run. The laser energy density on the target was about 2 J /cm^2. An encapsulated heater with an arrangement of KANTHAL wire in ceramic tubes and FIBROTHAL isolation material is built around the T-shape quartz tube. Growth temperature was 870–950 °C as measured by a thermocouple at the outer quartz tube wall. A downstream gas flow of argon of 0.05 to 0.2 l/min resulted in a gas pressure from 25 to 200 mbar. The target to substrate distance was varied between 5 and 15 mm. The *a*-plane or *c*-plane sapphire substrates were arranged off-axis, i.e., parallel to the expanding plasma plume. Gold films of nominally 1 nm thickness prepared with DC sputtering were usually used as catalyst.

2. Experimental procedure in Ref. 31 for growth of ZnO films

   ZnO films were grown with a conventional low-pressure PLD chamber. The substrate temperature (*Ts*) was about 600-750 °C, which is typically used for epitaxial oxide film. The oxygen partial pressure was about 10^{-4} bar. The 248 nm KrF laser with frequency of 10 Hz was usually operated with an energy density on the target of about 2 J /cm^2. The deposition rate was about 1 Å per laser pulse and the film thickness was easily controlled with applied laser pulses.

3. Scheme of the PLD growth route for core-shell nanowire heterostructures

   (a) Growth of low-density ZnO nanowire cores with HP-PLD; **(b)** Epitaxial shells growth along low-density cores with LP-PLD.


(a)
(b)