

## **Growth and Properties of Ultra-Violet Emitting Aligned Zinc Oxide Nanocones with Hexagonal Caps**

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### **Abstract:**

Ultraviolet-emitting, single-crystalline aligned zinc oxide (ZnO) nanocones with hexagonal caps were grown on silicon substrate via simple non-catalytic thermal evaporation process. High-purity metallic zinc powder and oxygen were used as source materials for zinc and oxygen, respectively. The detailed structural characterizations confirmed that the formed products are single-crystalline, possess a wurtzite hexagonal phase and grown along the c-axis direction. Raman-active optical-phonon E<sub>2</sub>high mode at 437 cm<sup>-1</sup> with sharp and strong UV emission at 385 nm in room-temperature photoluminescence (PL) spectrum demonstrated that the as-grown ZnO nanocones with hexagonal caps possess good-crystal quality with the excellent optical properties. Finally, a plausible growth mechanism for the formation of as-grown ZnO nanocones with hexagonal caps was also proposed.

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