

# **Non-catalytic growth of high-aspect-ratio Sb-doped ZnO nanowires by simple thermal evaporation process: structural and optical properties**

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## **Abstract:**

Well-crystallized high-aspect ratio Antimony (Sb)-doped ZnO nanowires have been successfully synthesized on Si(100) substrates in a large-quantity via simple thermal evaporation process by using metallic zinc and Sb powders in the presence of oxygen. It is observed from the detailed structural characterizations that the grown nanowires are well-crystallized with the wurtzite hexagonal phase and preferentially grown along the [0001] direction. It was clearly seen from the high-resolution TEM images that the Sb-atoms are successfully doped into the lattices of ZnO nanowires. The room-temperature photoluminescence (PL) spectrum exhibited a broad band in the visible region with a suppressed UV emission, indicating the presence of structural defects due to insertion of Sb-atoms in the lattices of as-grown nanowires. Due to the enhancement of green emission in the formed nanowires, these structures show great interest for typical applications of ZnO-based phosphors, such as field emissive display technology, etc.

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