

# One-step synthetic route for producing nanoslabs: Zn-oriented polycrystalline and single-crystalline zinc oxide

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## Abstract

In contrast to the present advances in shape control, we report Zn-oriented polycrystalline and single-crystalline ZnO nanoslabs through a facile one-step synthetic route, termed as “sol-gel-via-condensation-gradient” method. The nanoslabs were prepared in aqueous media at low temperature without the use of any surfactant or stabilizing agent. The novel nanoslabs are prepared with large quantity without aggregation. For the polycrystalline nanoslabs, consisting mainly of binary phases  $\text{Zn}(\text{OH})_2 \cdot 0.5\text{H}_2\text{O}$  and ZnO, their aspect ratios (length-to-width and width-to-thickness ratios) fall in the approximate range from 2 to 5. Room temperature photoluminescence emissions of the nanoslabs suggest that they are suitable for applications in optoelectronic devices. Especially, the enhanced emission by polycrystalline nanoslabs over single crystal nanoslabs is remarkable. Single-crystalline ZnO nanoslabs exhibited a strong and selective chemical sensitivity toward 4-triethoxysilylaniline.