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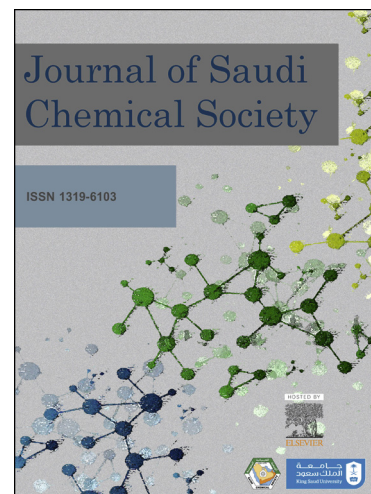
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Investigation of the growth parameters of hydrothermal ZnO nanowires for scale up applications

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Abstract

Zinc oxide nano-wires (ZnO NWs) are synthesized reproducibly with high yield via a low temperature hydrothermal technique. The influence of the growth duration time, growth temperature, zinc precursor and base concentration of Na₂CO₃ on the morphology of NWs is investigated. The growth products are characterised using scanning electron microscopy (SEM), Transmission electron microscopy (TEM), X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS) and photoluminescence (PL). SEM analysis shows that the optimum growth temperature is 140 °C and finds that length and diameter of ZnO NWs have a relationship with growth duration time and base concentrations of Na₂CO₃. In addition, it is reported that a high (~ 90%) yield of ZnO NWs can be synthesised via using any of three different precursors: zinc chloride, zinc acetate and zinc nitrate. TEM and XRD results indicate the high purity and the single crystalline nature of the ZnO NWs. XPS confirms the absence of sodium contaminants on the surface and indicates a near flat band surface condition. PL shows a large visible band in the yellow part of the spectrum, and a small

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