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Rapid photothermal processing for functionalization of nanostructured thin films

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Abstract

A rapid photothermal processing (RPP) technique has been developed to functionalize a new generation of nanostructured zinc oxide film materials. An environment-friendly chemical process was used to obtain nanostructures. The post-growth RPP at 650°C in N2 atmosphere of the nanostructured zinc oxide films leads to the suppression of deep-defect-level emission, improvement of near-band edge emission and was ascribed to the decrease of the structure defects compared to the initial nanostructures. The sensitivity of the nanostructured zinc oxide films to 100 ppm ammonia for the operation temperatures between 20°C and 300°C was essentially improved by RPP.

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