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Enhanced Field Emission Properties of Strain controlled ZnO Nanowire Arrays Synthesized by Employing Substrate Hanging Method

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High quality single crystalline strain controlled wurtzite ZnO nanowire arrays have been grown on conductive silicon and ITO substrates by a facile hydrothermal method. The diameter of the nanowires was found to be less than 90 nm approximately for both of the two kinds of substrates. The quality of the ZnO nanowire arrays is dramatically improved by hanging the substrate above from the bottom of the Teflon lined autoclave. The structural investigation indicates the preferential orientation of the nanowire along c-axis. In order to make the convincing comparison, the photoluminescence property of the nanowire arrays grown under different conditions are measured, the sharp near band edge emission from PL, low turn-on voltage ($1.9V/\mu m$) from field emission measurement and Fowler-Nordheim plot was investigated from ZnO nanowire arrays grown by proposed substrate hanging method.

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