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Photoluminescence and Raman Study of Well-Aligned ZnO Nanorods on p-Si Substrate

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Abstract

We report on optical properties of ZnO nanorods grown on p-type Si substrates by an electric-field assisted assembly technique in aqueous solutions applied at relative low temperature (96 °C). The results of micro-Raman study are indicative of high crystalline quality of the produced nanorods. The analysis of the photoluminescence properties of the material demonstrates the possibility to control the free carrier concentration by post-growth thermal treatment leading to the formation of compensating centers, while the crystalline quality of the material is not affected.