



## Transparent amorphous zinc oxide thin films for NLO applications

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Résumé en anglais  
This review focuses on the growth and optical properties of amorphous zinc oxide (ZnO) thin films. A high quality ZnO films fabricated by dip-coating (sol-gel) method were grown on quartz and glass substrates at temperature equal to 350 K. The amorphous nature of the films was verified by X-ray diffraction. Atomic Force Microscopy was used to evaluate the surface morphology of the films. The optical characteristics of amorphous thin films have been investigated in the spectral range 190-1100 nm. Measurement of the polarized optical properties shows a high transmissivity (80-99%) and low absorptivity (<5%) in the visible and near infrared regions at different angles of incidence. Linear optical properties were investigated by classic and Time-Resolved Photoluminescence (TRPL) measurements. Photoluminescence spectrum exhibits a strong ultraviolet emission while the visible emission is very weak. An innovative TRPL technique has enabled the measurement of the photoluminescence decay time as a function of temperature. TRPL measurements reveal a multiexponential decay behavior typical for amorphous thin films. Second and third harmonic generation measurements were performed by means of the rotational Maker fringe technique using Nd:YAG laser at 1064 nm in picosecond regime for investigations of the nonlinear optical properties. The obtained values of second and third order nonlinear susceptibilities were found to be high enough for the potential applications in the optical switching devices based on refractive index changes. Presented spectra confirm high structural and optical quality of the investigated zinc oxide thin films.

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