

OPTICAL PROPERTIES DEPENDENCE AS FUNCTION OF THE TEMPERATURE IN AlN FILMS DEPOSITED BY PLD

J.A. Pérez¹, H. Riascos¹, J. C. Caicedo², L. Yate³

¹ *Departamento de Física, Universidad Tecnológica de Pereira, Grupo plasma Láser y Aplicaciones A.A 097*

² *Grupo películas delgadas, Universidad del Valle, Cali – Colombia*

³ *Department de Física Aplicada i Òptica, Universitat de Barcelona, Catalunya, Spain*
jaimeandres@ingenieros.com¹

ABSTRACT

Amorphous AlN films were deposited by laser ablation technique (PLD) using Nd: YAG laser ($\lambda = 1064$ nm). The films were deposited in nitrogen atmosphere as working gas, aluminum target using high purity (99.99%), films were deposited with laser fluence of 7 J/cm^2 for 10 minutes on silicon substrates with orientation (100), the working pressure was 7 mTorr and substrate temperature was varied from 200°C to 630°C . The thicknesses of the films were measured by profilometer; with 100 nm for all films, nitrogen pressure was 7 mTorr. The morphology and composition of the films were studied using scanning electron microscopy (SEM) and Energy Dispersive X-ray analysis, respectively. The optical reflectance spectra and color coordinates of the films were obtained by spectral reflectometry technique in the range of $400\text{-}900 \text{ cm}^{-1}$ by an Ocean Optics 2000 spectrophotometer. In this work, a clear dependence of the reflectance, dominant wavelength and color purity in terms of the applied temperature to the substrate. Therefore was observed a reduction in reflectance with 30% when the temperature is increased from 200°C to 630°C . Keywords: Aluminum nitride, laser ablation, optical reflectance, color purity.

RIAO-OPTILAS Code: 11

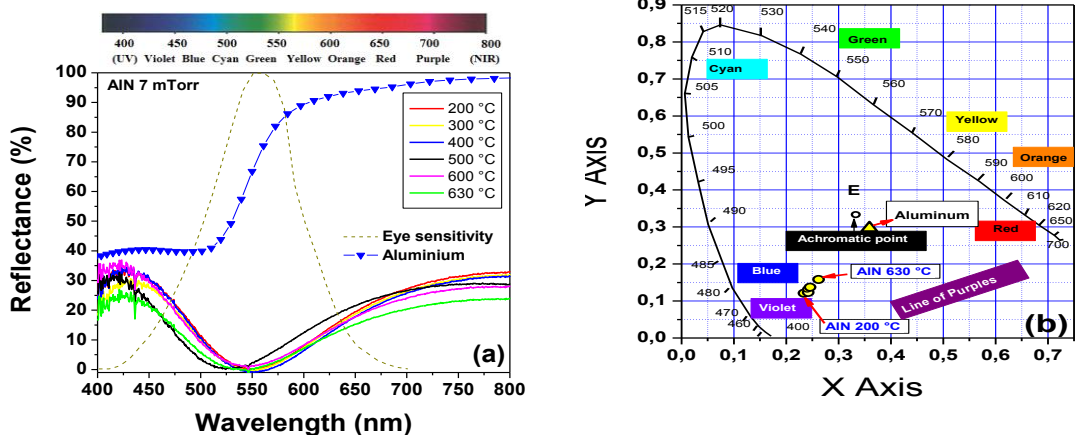


Figure1. Results dominant wavelength and color purity: (a) optical reflectance of AlN films deposited on Si (100) for different temperatures of substrate, optical reflectance of aluminum and the sensitivity of the eye is also represented as references. (b) Color diagram in X, Y coordinates for reflectivity in AlN films.

