Synthesis and characterization of NiO and NiO with Pd nanoparticles on the surface

I.Sta [1,*], M. Jlassi [1], M. Kandyla [3], M.Hajji [1, 2], P. Koralli [3], M. Kompitsas [3] and H. Ezzaouia [1]

[1] *Laboratoire de Photovoltaïque, Centre de Recherche et des Technologies de l'Energie, Technopole de Borj-Cédria, BP 95, 2050 Hammam-Lif, Tunisie.*

[2] *Institut Supérieur d'Electronique et de Communication de Sfax, Université de Sfax, BP 868, 3018 Sfax, Tunisie.*

[3] *National Hellenic Research Foundation, Theoretical and Physical Chemistry Institute, 48, Vasileos, Konstantinou Ave., 11635 Athens, Greece.*

[*] *email of corresponding author: imenstalpv@yahoo.fr*

Abstract

Nickel oxide (NiO) was synthesized by sol gel method and subsequently their surface partially covered by Pd nanoparticles with the aid of PLD for different deposition times. The effect of the Pd nanoparticles on the properties of NiO matrix was investigated. The Structural, morphological, and compositional properties were studied by X-ray diffraction (XRD), atomic force microscopy (AFM), scanning electron microscopy (SEM), and energy dispersive X-ray (EDX) spectroscopy respectively. The optical properties of the films were characterized by UV−visible spectrophotometry. The transmittance of the films decreases as the Pd content is increased. The dependence of the refractive index (n), extinction coefficient (k), and absorption coefficient (α) of the films on the wavelength was investigated. The band gap estimated was to E_g= 3.88, 3.94 and 3.91 eV, for NiO, NiO:Pd (1min) and NiO:Pd (2min), respectively.

Keywords: Nickel Oxide; palladium ; sol gel method; PLD.