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Editorial

Optical and Microstructural Characterization of Thin Layers

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Abstract: The microstructure and optical properties of layers strongly depend on the method of synthesis. This Special Issue on "Optical and Microstructural Characterization of Thin Layers" is a collection of papers on the relationships between the growth conditions and specific properties of thin films.

Keywords: thin films; microstructure; optical properties; synthesis

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Ch.Jayathilaka et al. [1] showed that the open-circuit voltage and crystal orientation of the cuprous oxide (Cu_2O) homojunction fabricated by using the electrochemical method is significantly influenced by the pH of the lactate bath. Moreover, it turns out that sulfur treatment and annealing increase the photocurrent tenfold compared to the pristine (untreated and unannealed) homojunction solar cell.

P.Potejanasak and S.Duangchan [2] proposed a control method for the self-organization process for gold nanoisland array formation on the quartz glass substrate. The large and sparse gold nanoislands are formed on etched quartz glass, while small and dense structures are aggregated on a chemically treated substrate. It is demonstrated that the shape and size of Au nanoislands strongly influence their optical properties.

A. Méndez-López et al. [3] investigated the effect of annealing temperature on the water wettability of the ZrO_2 surfaces. The best hydrophilicity has been achieved for thin films annealed at 550 °C. This result is explained as an effect of the structural and morphological change to the films. Note that the deposited ZrO_2 layers exhibit high average optical transparency (above 70% in the visible spectral range).

The effect of solution concentration, thermal annealing, excitation wavelength and moisture on the optical properties and nanostructure of the thin films prepared from A-PEGCP with self-assembly nanoparticles (spin-coated on ITO-coated glass substrates) films were investigated by Kwang-Ming Lee et al. [4]. The nanoparticles formed with a mean diameter distribution ranging from 3.7 to 52.8 nm increase with the increase in the concentration of solution from 1 to 50 mM. This leads to an increase in photoluminescence intensity.

The effect of germanium wetting layer in Au(Ag)/Ge/Au(Ag) multilayer systems has been studied by A.Ciesielski at al. [5]. It was found that, in the Au/Ge/Ag structure, the segregation of germanium in silver is inhibited; however, is not completely canceled. In these multilayers, the surface concentration of germanium drops by an order of magnitude compared with that of multilayers containing only Ag or Au.

Structural, optical and electrical properties of Tb and Yb co-doped ZnO thin films for photovoltaic devices fabricated on glass substrates using the spray pyrolysis technique were investigated by A. El hat et al. [6]. The deposited films exhibit the hexagonal wurtzite structure with a privileged direction of growth (002). The doped zinc oxide layers exhibit a luminescence band at 980 nm. This line is characteristic for the Yb^{3+} transition between $^2F_{5/2}$ and $^2F_{7/2}$ electronic levels.

This Special Issue on “Optical and Microstructural Characterization of Thin Layers” may be considered a collection of selected papers that present relationships between synthesis conditions and optical properties as well as the microstructure of inorganic and organic thin films.

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