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Indium tin oxide thin films deposited by pulsed laser deposition on nanopatterned glass substrates

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Firstly, periodic pillars featured by width of ~350 nm, height of ~250 nm and separation pitch of ~1100 nm were realized in a polymer layer deposited on glass substrates using UV nano imprint lithography (UV-NIL) technique. Afterwards, indium tin oxide (ITO) films were deposited on the nanopatterned substrates by pulsed laser deposition (PLD) method in the following experimental conditions of 1.2 J/cm^2 laser fluence, 1.5 Pa oxygen pressure, 7000 number of the laser pulses and unheated substrate. ITO films were also grown on flat glass in order to make a comparison between the properties of the films obtained on patterned and non-patterned substrates. The structural, compositional, morphological, optical and electrical properties of ITO layers were investigated. The EDX analysis reveals that the ITO films preserve the In_2O_3:SnO_2 weight ratio of the ITO target (In_2O_3:SnO_2=90%:10% weight). The morphological investigation proves that the PLD deposited ITO films preserve the pattern of the used substrates. The patterned and non-patterned ITO films present a good optical transparency and a reduced electrical resistivity (<2.8 x10-4 Ωcm). However, an improvement in the Hall mobility was obtained in the case of the nanopatterned ITO films, which mean that combining UV-NIL (a cost-effective technique to fabricate nanopatterns even on large area) and the PLD method for growing TCO films can be fabricated on nanopatterned ITO films for potential applications in the field of the organic devices.

Biography

Carmen Breazu received the PhD Degree in Solid State Physics at University of Bucharest, Faculty of Physics. She works as Scientific Researcher at National Institute of Materials Physics, Magurele, Romania. During the PhD stage she earned a scholarship in the frame of an international project (European Social Fund through Sectoral Operational Programme Human Resources Development - POSDRU). Along her research activity, she made a research internship at University of Angers, Angers, France and was involved in some projects about bio-organic semiconductors. (Fabrication of osteoconductive and orthopedic implants with gradual 3D hierarchical structure; Metallic electrode with 2D photonic crystal type architecture for Bio (organic) multilayer structure). Also, during the PhD stage she participated at two summer schools having as subject the photovoltaic devices. Her research activity was materialized in ISI indexed papers and part of them being published in high ranked scientific journals.

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