JEMNÁ MECHANIKA A OPTIKA

VĚDECKO-TECHNICKÝ ČASOPIS
ROČNÍK 59 2/2014

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FINE MECHANICS AND OPTICS

SCIENTIFIC-TECHNICAL JOURNAL
VOLUME 59 2/2014

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The main aim of this work was preparation of iron disulfide FeS_2 thin films in the crystalline structure of pyrite by means of chemical sol-gel method. By using this technique the extent of surface defects such as pinholes is sufficiently minimized. The structural, morphological, electronic and optical properties of the deposited films were determined using X-ray diffraction (XRD), Raman spectroscopy, scanning electron microscopy, Auger electron spectroscopy (AES), UV-Vis absorption spectroscopy, Hall effect and profilometry. The effects of annealing and sulfurization temperatures were studied. The work was also devoted to the research of sodium diffusion from the substrate due to the thermal treatment and its effect on the pyrite films functionality.

ZnO thin films prepared by multi SWD plasma jet system (M. Kohout, J. Olejníček, J. Šmíd, M. Čada, Š. Kment, P. Kšírová, M. Brunclíková, Z. Hubička) 38
In this paper we deal with multi plasma jet system with 4 independent nozzles working on the principle of surfatron generated discharge. Developed system was optimized for plasma-enhanced chemical vapor deposition (PECVD) of ZnO thin films and ZnO films doped by aluminum and manganese. Time-resolved measurement of plasma parameters of low pressure deposition process in pulse mode was performed in order to estimate plasma density and electron temperature in the active part of plasma channel. Consequently the set of ZnO thin films with thickness 300 nm was prepared and analyzed by XRD, SEM, EDX, surface profilometry, UV-light amperometry and optical ellipsometry. All samples under study were crystalline in nature, revealed N-type conductivity with band gap 3.5 eV and were photo-electrochemically active.
Keywords: ZnO, surfatron, thin films, Langmuir probe, plasma density

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Using fused deposition modeling for production of test specimens determined for practical training of students (M. Müller, M. Linda, R. Chotěborský).....46
Teaching students, especially in technical disciplines, is beneficial in a moment when the theoretical and practical context is understood, but also how material constants can be found. To ensure optimal conditions of instruction in technical subjects it is fundamental to implement laboratory trainings where students are learning methods of the material measuring and they get pieces of knowledge about a test equipment. In many cases and due to financial and capacity reasons, the present trend leads to the minimization of practical training which is focused on theoretical lessons. The production cost of test samples can be currently addressed using FDM. These FDM methods are able with minimal expenses produce sufficient quantities of specimens for a practical experiment within the laboratory training.
Keywords: laboratory training, technical discipline, learning, fused deposition modelling (FDM)

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The article deals with an analysis of dispersion curves of Lamb's ultrasonic wave propagating through the material with the shape of a thick plate. The purpose of this research is to determine the ocurrance of particular Lamb's wave at certain frequencies in the specific material sample. The symmetrical modes of orders S1, S2, S3 and S4 are demonstrated for frequencies 100 kHz, 140 kHz, 260 kHz and 340 kHz, respectively. Antisymmetrical modes of orders A1, A2, A3 and A4 appear for frequencies 70 kHz, 190 kHz, 235 kHz and 330 kHz, respectively. Modes S0 and A0 occur from the origin of the frequency band.
Keywords: dispersion curves, Lamb's wave, frequency

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Keywords: rotationally symmetric aspherical surface, aspheric equation, Forbes polynomials

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