assisted biaxially textured substrates) [1], epitaxially grown ceramic buffer layers and also textured ceramic buffer layers like YSZ (yttria stabilized zirconia), which were deposited with the so-called IBAD technology (ion-beam assisted deposition) [2]. Our measurements will be compared to the results using conventional sealed-tube setups.

[1] Goyal et al., *Appl. Phys. Lett.*, **1996**, 69, 1795. [2] Iijima et al., *Physica C*, **1991**, 185, 1959.

Keywords: texture studies; two-dimensional diffraction; thin films

FA2-MS06-P09

Effect of Sn Dopant on the Crystalline Structure of Sol-Gel Coated ZnO Film. Yasemin Caglar[a], Mujdat Caglar[a], Saliha Ilican[a]. [a]*Anadolu University, Department of Physics, Eskisehir, Turkey.*
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Undoped and Tin doped zinc oxide (ZnO and ZnO:Sn5%) films have been prepared by sol-gel process using spin coating method. Zinc acetate dehydrate was used as starting materials. 2-methoxyethanol and monoethanolamine were used as a solvent and stabilizer, respectively. The dopant source is tin cloride. The coating solution was dropped into glass substrate, which was rotated at 3000 rpm for 30 s using a spin coater. After the spin coating, the film was dried at 300 oC for 10 min in a furnace to evaporate the solvent and to remove organic residuals. This coating/drying procedure was repeated for ten times before the film was inserted into a tube furnace and annealed at 450 oC in air for 1 h. The crystal structure and orientation of the films have been investigated by X-ray diffraction method. The films have the polycrystalline structure and (002) as the preferred orientation. The information on strain and crystallite size was obtained from the fullwidths-at-half-maximum (FWHM) of the diffraction peaks. The texture coefficient and lattice parameters of the films were also calculated. The deformation in crystalline structure of the ZnO film was observed due to Sn incorporation.

Keywords: metal oxides; sol-gel method; X-ray diffraction and structure

FA2-MS06-P10

XRD Study of Indium Oxide Film Deposited by Sol-Gel Spin Coating. Mujdat Caglar[a], Saliha Ilican[a], Yasemin Caglar[a], Fahrettin Yakuphanoglu[b]. [a]*Anadolu University, Department of Physics, Eskisehir, Turkey.* [b]*Firat University, Department of Physics, Elazig, Turkey.*
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Transparent-conducting oxide (TCO) film coatings are important in a number of optoelectronics devices including photovoltaic cells. In this study, Indium oxide film has been prepared by sol-gel process using spin coating method. Indium III chloride, 2-methoxyethanol and monoethanolamine were used as a starting materials, solvent and stabilizer, respectively. A liquid film on glass substrate was formed in a spinning-coater at a spinning speed 2000 rpm for 30s. After the spin coating, the film was dried at 120 ^{o}C for 10 min in a furnace to evaporate the solvent and to remove organic residuals. This coating/drying procedure was repeated for ten times before the film was inserted into a tube furnace and annealed at 300 ^{o}C in air for 45 min. The heat treatment temperature was selected 400 ^{o}C and 500 ^{o}C (in air for 1 h). The crystal structure and orientation of the films have been investigated by X-ray diffraction method. Indium oxide film has polycrystalline structure. Some structural parameters such as texture coefficient, lattice parameters, grain size of the film were calculated. Surface morphology of the film has been also analyzed by a scanning electron microscope (SEM). The enhanced in crystalline structure of the Indium oxide film was observed due to heat treatment.

Keywords: metal oxides; sol-gel method; X-ray diffraction and structure

FA2-MS06-P11

Effects of Plastic Deformation and Inhomogeneous Thermal Fields During Grinding and Milling on the Real Structure of Steels. Zdenek Pala[a], Nikolaj Ganev[a], Jan Drahokoupil[a,b]. [a]*Department of Solid State Engineering, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic.* [b]*Department of Metals, Institute of Physics,Academy of Sciences of the Czech Republic, Prague, Czech Republic.*
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Mechanical surface treatments like grinding and milling are often used as the last machining operations and have, therefore, pronounced impact on the resulting real structure of surface layers. Since the surface itself forms an interface between the bulk and its neighborhood, knowledge of its real structure represents information which is paramount for understanding various surface-related processes as well as for surface quality assessment. An effective source offering diverse array of real structure parameters can be found in analysis of data from suitably designed diffraction experiments. Both milling and grinding are accompanied by plastic deformation and thermal fields which are inherently inhomogeneous due to the anisotropy of directional movements of the used tool. In general, two dominant physical processes are under way. Firstly, energy of plastic deformation and friction between the tool and the machined object generate heat whose presence causes creation of inhomogeneous thermal fields. These fields dynamically evolve as the whole system strives to get into thermal equilibrium and as the tool goes back and forth. Secondly, the surface layers of machined object are being removed and plastic deformation is, thus, inherently inhomogeneous. Moreover, external forces and moments are present and as soon as they cease to be in action, the object proceeds to the state of mechanical equilibrium [1] while the unloading can be