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Structure of magnetron sputtered SmNiO₃ thin films

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Perovskite oxides from RNiO₃ family (R – rare earth ion) are of great interest due to the metal-insulator transition they exhibit [1,2]. For possible applications it is vital to study the material of a thin film structure. Therefore within this work a SmNiO₃ thin film deposited by radio frequency magnetron sputtering on Si(100) have been studied. The influence of the deposition conditions as well as annealing on the structure and electronic properties was investigated. We found out that the standard deposition atmosphere, which is a mixture of argon and oxygen gases, facilitates columnar growth along a certain crystallographic direction, while deposition in pure argon results in polycrystallinity of the films. Several techniques were used in order to characterize obtained samples, including x-ray diffraction, x-ray fluorescence spectroscopy, x-ray photoelectron spectroscopy, secondary ion mass spectroscopy and atomic force microscopy with a conducting tip. What is more in order to get insight into local composition XPEEM microscopy was used.

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Electrochemical synthesis and structural studies of zinc complexes with benzofuran derivatives

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Zinc plays structural and catalytic role in a number of enzymes [1]. Therefore, a detailed understanding of its functions requires information on how the chemistry of zinc is modulated by its coordination environment.

In our laboratory, several zinc(II) complexes with benzo[b]furancarboxylic acids were electrochemically synthesized [2]. The compounds were obtained as microcrystalline powders and structurally investigated by IR spectroscopy, elemental and thermal analyses as well as XAFS spectroscopy. In parallel, the powdered complexes were dissolved in a number of solvents and subjected to the process of crystallization. The slow evaporation of solvents allowed to receive the crystals, suitable for the X-ray diffraction studies, for one complex only.

The structural studies indicated that the carboxylate group of ligand can bind in the monodentate and bidentate modes to the Zn cation.

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