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$La_{0.7}Ce_{0.3}MnO_3$ thin films were grown epitaxially by pulsed laser deposition on (001) $SrTiO_3$ substrates. The evolution of the growth front and the film thickness were monitored in-situ by means of high-pressure reflection high energy electron diffraction, while the morphology and crystal structure were analyzed by atomic force microscopy and X-ray diffraction, respectively. Furthermore, electrical transport and magnetic properties of the films were studied in the 5–300 K temperature range.
Single phase films could be obtained only for $p_{O_2} > 0.13$mbar. With increasing pressure, the roughness increased. A roughness of one unit cell could only be obtained at a pressure around 3Pa. The evolution of the electric transport and magnetic properties with the level of strain (film thickness) will be discussed. Depending on the deposition parameters we got a transition temperature between 220-260 Kelvin.

DS 17.47 Tue 9:30 Poster A

Magnetic properties and exchange bias effects in nanocluster assembled films of equiatomic Fe-X (X=Pd, Pt, and Au) synthesized by inert gas phase condensation — Chandrahas Bansal[1,2], •Ajay Kumar Mishra[1], and Horst Hahn[1] — [1]Institute for Nanotechnology, Forschungszentrum Karlsruhe, Karlsruhe 76021, Germany — [2]University of Hyderabad, Hyderabad 500 046, India

Nanocluster assembled films of equiatomic Fe-Pd, Fe-Pt, and Fe-Au alloys were synthesized using a UHV nanocluster film deposition system (model NANODEP60 from Oxford Applied Research, UK). The films were nanoporous and consisted of agglomerates of small size nanoclusters of diameters 4 to 5 nanometers. The M(T) data in zero-field-cooled (ZFC) and field-cooled (FC) states revealed a blocking temperature of 33 K, 35K, and 41K for the Fe-Pt, Fe-Pd, and Fe-Au cluster films. Besides this, there was a paramagnetic response at lower temperatures both in the ZFC and FC states showing that there was a partial oxidation of the clusters even in the as-prepared films although they were deposited at base pressures of 10-8 torr. The defect states in the oxide shell gave rise to these moments that remained uncoupled to the antiferromagnetic lattice. A exchange bias of about 1 KOe was observed in all the three alloys with the lowest value for Fe-Au and the highest value for Fe-Pd cluster films.

DS 17.48 Tue 9:30 Poster A

Soft Magnetic nanocomposite films for high frequency applications — •Amit Kulkarni[1], Henry Greve[1], Andreas Gerber[2], Ulrich Schürmann[2], Vladimir Zaporojtchenko[1], Eckhard Quandt[2], and Franz Faupel[1] — [1]Chair for Multicomponent Materials, Institute for Materials Science, Christian-Albrechts University at Kiel, Kaiserstr. 2, Kiel, Germany, 24143. — [2]Chair for Inorganic Functional Materials, Institute for Materials Science, Christian-Albrechts University at Kiel, Kaiserstr. 2, Kiel, Germany, 24143.

Advances in mobile communication have stimulated research on high frequency magnetic components. Nanocomposites with either a particulate or a multilayer nanostructure are promising candidates and could play an important role in such magnetic high frequency applications. Thin multilayer films of sputtered PTFE (Teflon) and $Fe_{54}Ni_{27}Co_{19}$ with different layer thicknesses were prepared by vapor-phase tandem deposition. These films are several hundred nanometers thick and consist of $Fe_{54}Ni_{27}Co_{19}$ as ferromagnetic and a fluoropolymer as the insulating material component. So far we were able to obtain cut-off frequencies up to 5 GHz and HF-permeabilities above 100 for the multilayer nanostructured films. In addition to a Teflon dielectric, FeCoV- TiO_2 / TiO_2 nanocomposite multilayer system were prepared with a very thin isolation layer of TiO_2. Both approaches proved to be promising as novel high frequency components up to the GHz range.

DS 17.49 Tue 9:30 Poster A

Reactive deposition of SnO2:Sb thin films utilizing HPPMS: Correlation between film properties and process parameters — •Janika Boltz, Dominik Köhl, and Matthias Wuttig — I. Physikalisches Institut (1A), RWTH Aachen, 52056 Aachen

In recent years high power pulsed magnetron sputtering (HPPMS) has gained growing interest due to its inherent advantages over conventional dcMS that mainly arise from the increased plasma density and thereby ionization of the sputtered material. It has been demonstrated e.g. for several metal targets that the large degree of ionization (up to 70%) in the sputtered species and the resulting low-energy bombardment of the substrate can promote the growth of films with increased density and low surface roughness. But only recently the new technique has first been applied also to the reactive deposition of metal oxides where e.g. a stabilization of the transition regime has been achieved. In the present work, the potential of HPPMS is explored with respect to the reactive deposition of SnO2:Sb with the aim to develop a comprehensive understanding of the correlations between process parameters and film properties. As a first step, some results of the comparison between dcMS and HPPMS will be shown where both the process characteristics and the film properties are discussed.

DS 17.50 Tue 9:30 Poster A

Atomic layer deposition of silicon dioxide with sub nm-precision — •Robert Zierold[1,2], Julien Bachmann[1,2], Yuen Tung Chong[2], Chris Sturm[3], Marius Grundmann[3], Bernd Rheinländer[3], Ulrich Gösele[2], and Kornelius Nielsch[1] — [1]Institut für Angewandte Physik und Zentrum für Mikrostrukturforschung, Universität Hamburg, Germany — [2]Max-Planck-Institut für Mikrostrukturphysik, Halle/Saale, Germany — [3]Abteilung Halbleiterphysik, Universität Leipzig, Germany

Atomic layer deposition (ALD) is suitable for producing homogenous, thin solid films for various applications in micro- and optoelectronics. We have developed a method for the deposition of silicon dioxide by ALD. Exposure of a flat substrate to consecutive pulses of three gaseous precursors (3-aminopropyltriethoxysilane, water, ozone) deposits SiO2 in monolayer by monolayer fashion. The presence of the amino group within the silane precursor is essential to the growth. It catalyzes the cleavage of the strong Si-O bonds and thereby allows the precursor to bond to the surface.

Electron microscopy, atomic force microscopy and spectroscopic ellipsometry evidence the growth of thin, smooth and pure SiO2 films at a rate of 0.6(+/-0.1) Å per cycle. The novel process allows the conformal deposition of SiO2 into porous alumina templates as well, and yields nanotubes of high aspect ratio (˜1000) with tunable diameter (40 to 160 nm) and wall thickness (1 to 50 nm). We are currently exploring applications to Bragg reflectors, complex optical heterostructures and chemically resistant coatings by this process.

DS 17.51 Tue 9:30 Poster A

Realisation of steady state liquid phase epitaxy for growth of polycrystalline silicon layers on amorphous substrates — •Robert Heimburger, Klaus Böttcher, Thomas Teubner, and Torsten Boeck — Institute for Crystal Growth, Berlin, Germany

The growth of polycrystalline silicon layers on amorphous substrates from metallic solutions at low temperatures is one of the present challenges to overcome the problem of producing low cost thin film solar cells. Generally, the solubility of silicon in metals with low melting point is small at these temperatures.

In order to be able to enhance mass transport of silicon to the surface, we apply a modified classical liquid phase epitaxy called *steady state* liquid phase epitaxy. A detailed experimental study of saturation conditions at the surface of the sample when setting up different heating arrangements will be presented. Selective adjustment of growth and dissolution of silicon at the surface of Si(100) and Si(111) can be shown. Experimental findings will be discussed by means of additional finite-element-simulations of temperature and fluid flow behaviour of the growth arrangement.

DS 17.52 Tue 9:30 Poster A

Reactive Deposition of TiO_x and TiN_x Layers in a DC-Magnetron Discharge — •Stefan Wrehde[1], Marion Quaas[2], Robert Bogdanowicz[3], Hartmut Steffen[4], Harm Wulff[2], and Rainer Hippler[1] — [1]Institute of Physics, University of Greifswald, Felix-Hausdorff-Straße 6, 17489 Greifswald, Germany — [2]Institute of Biochemistry, University of Greifswald, Felix-Hausdorff-Straße 4, 17489 Greifswald, Germany — [3]Department of Optoelectronics and Electronical Systems, Gdansk University of Technology, ul. G. Narutowcza 11/12, 80-952 Gdansk, Poland — [4]Leibnitz-Institute for Plasma Science and Technology e.V., Felix-Hausdorff-Straße 2, 17489 Greifswald, Germany

Thin solid TiO_x and TiN_x films have been deposited by means of a DC magnetron plasma. Reactive gas type (oxygen or nitrogen), reactive gas flow, discharge power and operation mode of the magnetron ("balanced" or "unbalanced") have been varied. Different x-ray techniques (XPS, XR, GIXD) have been applied for research on the chemical composition and the structure of the deposited films. It was found that the operation mode of the magnetron has a significant influence on the