Owing to a number of unique properties, the SL has good prospects of being widely applicable to microelectronics and computer engineering. Being important in applications, the SL perfection has been investigated by various methods of X-ray and electron microscopy analysis. One of the possible defects in artificial SL is the stacking fault. In the present paper the dynamic theory of X-ray diffraction on the one-dimensional SL with a stacking fault between layers is developed.
A formula for the dependence of reflectivity on the phase of the stacking fault and its depth is obtained. For comparison with ideal superlattice, the relative modification of reflectivity is calculated. It is shown, that presence of stacking fault reduces intensity of satellites. Thus, the closer defect to the surface of the SL, the less its action on the diffraction pattern.
As is known, the interference absorption factor of a multilayered crystalline system has oscillating character. In the present paper it is shown, that presence of stacking fault reduces the interference absorption factor, maintaining its oscillations. The formula for the relative modification of the interference absorption factor is obtained.

The work is supported by Russian Foundation of Basic Research grant №05-02-17391, Russian Science Support Foundation.

MS 37 P06

Synchrotron station "Langmuir" at Kurchatov Center of Synchrotron Radiation and Nanotechnology

E.Yu. Tereschenko, V.V. Lider, V.A. Shishkov, Yu.N. Shilin, S.I. Zheludeva, M.V. Kovalchuk
Shubnikov Institute of crystallography Russian Academy of Science, Moscow, Russia.
E-mail: helen_t@ns.crys.ras.ru

Keywords: Langmuir monolayer, X-ray fluorescence, synchrotron X-ray instrumentation

Project of SR station "Langmuir" – the first Russian SR facility which is dedicated to study interfaces (liquid/air, liquid/liquid, liquid/solid and solid/solid); inorganic, organic and bioorganic nanolayers on water surface as well as on solid substrate; lipid-protein systems on liquid subphase, ets.
Structural configuration of station includes: *double-crystal monochromator with slits* which prepare fixed position X-ray beam over energy range 2 – 38 keV; *double-element setup* for beam deflection at grazing incidence; *sample unit* – Langmuir trough or multicircle goniometer for solid samples; *detector unit* – X-ray detectors (scintillation counter or linear position-sensitive) and fluorescent SSD.
Double-element setup was specially designed for X-ray beam deflection on the fixed Langmuir trough: first element deflects the beam from horizontal plane, the second one – directs the beam on liquid surface. Application of different couples of reflecting elements: two total reflection mirrors; multilayer structure – gradient multilayer structure; total reflection mirror – gradient multilayer structure, allows to change working range from 0 up to $Q_z^{max} \sim 0.12 \div 0.35$ Å^{-1}.
Optical scheme of the station makes it possible to realize different X-ray surface-sensitive techniques such as: total reflection X-ray fluorescence analysis; X-ray standing wave at total reflection conditions; high resolution X-ray reflectivity; grazing-incidence diffraction.
The station is planed to be in operation at the end of 2007.

MS37 P07

Structure and dielectric properties of $Ba_{1-x}Sr_xTiO_3$ ceramics

A. Aoujgal[a,b], A. Bouifoulen[a], A. Tachafine[b], J. C. Carru[b], H. Ahamdane[c] and A. Outzourhit[a], [a]*Laboratoire de Physique du solide et des couches minces (LPSCM), Faculté des sciences Semlalia, Université Cadi Ayyad, BP 2390.Marrakech, Morocco*. [b]*Laboratoire d'Etude des Matériaux et des Composants pour l'électronique (LEMCEL), Université du Littoral - Cote d'Opale, BP 689, 62-228 Calais, FRANCE.* [c]*Laboratoire des Sciences des Matériaux (LSM), Faculté des sciences Semlalia, Université Cadi Ayyad. BP 2390 Marrakech, Morocco.* E-mail : aaoujgal@ucam.ac.ma

Keywords: Ferroelectric, perovskite, X ray diffraction.

Ceramics of barium strontium titanate are widely used in the electronics industry, in particular because of their high constant dielectric and its remarkable ferroelectric properties. Different compositions of this ceramic (x=0.8, 0.4, 0.35 and 0.2) with perovskite structure were synthesized by the conventional solid state reaction. Stoichiometric amounts of BaCO3, SrCO3 and TiO2 of high purity where thoroughly mixed using. The mixture is calcined at 1225 °C for 5 h. The calcined powders were ground and pelletized at a pressure of 2 tons. The pellets were subsequently sintered at 1400 °C for 1 h.The obtained pellets were characterized by X ray diffraction and scanning electron microscopy. The dielectric properties of the various samples were analyzed. Measurements of the capacity and conductance as a function of temperature were taken in the temperature range 10K to 300 K at various frequencies (1KHz, 10KH and 20KHz). Measurements were taken in a helium gas closed cycle cryostat which was recently installed in our laboratory (a).
The x-ray diffraction measurements revealed that the formation of the pervoskite phase for all the compositions studied with no detectable secondary phases. The lattices parameter and the transition temperature evolved with the composition x of strontium. The results of the structural, microstructure and dielectric studies will be presented and discussed.

MS37 P08

Structure studies of a titanium oxide nanoporous matrix

A. Bouifoulen[a], M. Elyaagoubi[a], A. Aoujgal[a], D. Abouelaoualim[a], M. Khadiri[b], A. Oueriagli[a] and A. Outzourhit[a] [a] *State Physics and thin films Laboratory, Physics department, Faculty of Sciences Semlalia, Marrakech, Cadi Ayyad University, POB 2390, Marrakech Morocco.* [b] *Centre of blood transfusion, Ministry of health, Marrakech Morocco.*
E-mail: ablabofoln@gmail.com

Keywords: nanoporous, titanium oxide, XRD.

Nanoporous titanium oxide matrices were obtained by anodization of highly purity of titanium (99.97%) sheets in a mixture of HF, H_2SO4 and H_3PO_4 acid baths. The voltage was maintained by an ELC Al 781 N power supply. The titanium sheet was the anode and a sheet of platinum was the cathode. The anodization voltage was

varied between 15 and 30 volts, during 40 minutes to 6 hours. The obtained structures were characterized by X -ray Diffraction and scanning electron microscopy.
We have recorded the variation of the current density against time during the anodization. These curves showed similar shapes: we first note a decrease of the current density followed by stabilisation, and then an increase of the current density. The minimum of the current density depends on the applied voltage.
Microstructural studies carried out by scanning electron microscopy showed that the pore diameter was about 75 nm and depended on the anodization voltage and time. Elemental analysis by energy dispersive X-ray microanalysis revealed the obtained nanoporous matrices are mainly titanium oxide. The results of the evolution of their structure as revealed by X ray diffraction will be presented as function of the various anodization parameters.

MS37 P09

Electrodeposition of films and multilayer of Bi and Te
M. Elyaagoubi[a], A Bouifoulen[a], M. Khadiri[b], D. Abouelaoualim[a], A. Aoijgal[a], R. Hyed[a] A. Oueriagli[a] and A. Outzourhit[a], [a] *State Physics and thin films Laboratory, Physics department, Faculty of Sciences Semlalia, Marrakech, Cadi Ayyad University, POB 2390, Marrakech Morocco.* [b]*Centre of blood transfusion, Ministry of health, Marrakech Morocco.*
E-mail: melyaagoubi@gmail.com

Keywords: Thin film, electrodeposition, XRD

The thermoelectric power coefficient of a alloys and semiconductor compounds is extremely sensitive to there microstructure and the composition.
In this wok we have used electrochemical deposition of thin films of thermoelectric material Te (Tellurium) and Bi (Bismuth) and multi-layers Bi/Te/Bi/Te.....
Bismuth and tellurium films were electrodeposited potentiostatically on nickel or ITO substrates using an acidic solution containing Bi^{3+} and $HTeO^{-}_2$ ions in 1M nitric acid (pH~1). A platinum sheet was used as counter electrode. A potentiodynamic study was performed to find the deposition potentials of the various compounds. It was found that a potential of -0.35 V/SCE was used for the deposition of both Bi, Te Bi/Te multilayers. The obtained films were characterises by X-ray diffraction, scanning electron microscopy and X-ray microanalysis in the energy dispersive mode. The deposited films adhered well to the substrate and their surfaces were rather smooth. The results of the structural studies are discussed.

MS37 P10

Characterization of Structural, Optical and Electric Properties of TiO_2 Thin Films Prepared by Reactive DC Magnetron Sputtering S. Boukrouh[ab], R. Mechiakh[a], R. Bensaha[a], S. Bourgeois[b], M.C. Marco de Lucas[c], [a]*Laboratoire de Céramiques, Département de Physique, Université Mentouri Constantine (25000) Algérie.* , [b]*Laboratoire de Recherche sur la Réactivité des Solides (LRRS), UMR 5613, CNRS-Université de Bourgogne, 9 avenue A.Savary, BP 47870, 21078 Dijon Cedex -France.*
E-mail : bensaha@yahoo.fr

Keywords: TiO_2, thin films, sputtering

At the present moment, many researchers focus their studies on thin solid films of TiO_2 who presents very interesting optical, electrical and chemical properties. These properties make it suitable for wide applications such as photo–catalysts, electronic, optical wave guides, and photochemical solar cells [1–3] for the solar energy transformation into electricity. TiO_2 films can be produced by many methods, such as reactive evaporation [4], PACVD [5], reactive DC magnetron sputtering [6] this latter has gained significant importance for depositing a variety of hard coatings. This is due to the ease of control over the stoichiometry of the deposited film, and so on. In this study, we interested ourselves in the study of structural and optical properties of TiO_2 thin films prepared by reactive DC magnetron sputtering. For this purpose, we studied the evolution of the refractive index, porosity, grain size, and crystal structure of TiO_2 thin films obtained for different deposition time and annealing temperatures. XRD and Raman analyzes of our thin films of TiO_2 show that at deposition time 60 min crystallize in the phase anatase, starting from the temperature of annealing 350°C. The size of the nano–crystals varies from 12.6 to 18.6 nm. The index of refraction (n), and porosity (p) are calculated starting from the measured transmission spectra, and vary between 2.10 and 2.32 for (n), and from 36.1 to 17.9% for porosity (p). Our films, irrespective of treatment temperature and deposition time, are transparent in the visible range and opaque in the UV region.

[1] Takeda S; Suzuki S; Odaka H; Hosono H; *Thin Solid Films.* 2001, 392, 338.
[2]. Brown W.D; Granneman W.W; *Solid State Electron.* 1978, 21, 837.
[3] Siefering K.L; Griffin G.L; *J. Electrochem. Soc.* 1990, 137, 1206.
[4] Lobl P; Huppertz M; Mergel D; *Thin solid Films.* 1994, 251, 72.
[5]. Frenck H.J; Kulisch W; Kuhr M; Kassing R; *Thin Solid Films.* 1991, 201, 327.
[6] Meng L.J; Santos M.P; *Thin Solid Films*. 1993, 226, 22.