PS12.03.16 THE X-RAY STUDY OF THE YSZ/MGO(001) INTERFACE: THE DYNAMICAL APPROACH. Tsai-Sheng Gau* and Shih-Lin Chang*#, *Department of Physics, National Tsing Hua University, Hsinchu 30043, Taiwan, R.O.C., #Synchrotron Radiation Research Center, Hsinchu 30077, Taiwan, R.O.C.

The X-ray dynamical approach is used to describe the interface morphology of YSZ/MgO(001) from the grazing incident X-ray diffraction data. Two surface-normal rod scans, (20l) and (22l), are respectively simulated without any structure modeling. The influences on the rod interference patterns of the complicated structures at the interface are presented by only two parameters, the absolute amplitute and phase of the electric succeptibility. These two parameters are then considered as the fitting parameters for the dynamical simulation.

Three kinds of novel crystallites are found to exist at the interface and the structures of these crystallites are of the c-elongated tetragonal structure, which are believed to be unstable. The thicknesses, occupancies, and lattice constants of these crystallites are also determined. A later measurement of the (22l) rod was taken to confirm the instability of these crystallite structures.

PS12.03.17 INTERACTION BETWEEN X-RAYS AND SURFACE ACOUSTIC WAVES : APPLICATION TO THE SPACE-TIME MODULATION OF AN X-RAY BEAM Michel Brunel[1], D. Roshchupkin[1,2], I. Schelokov[1,2], R. Tucoulou[1]
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The reflection of an X-ray beam ($\lambda \sim 1$ Å) on a piezoelectric crystal excited by surface acoustic waves produces satellite peaks on both sides of the reflected beam.

We showed that : The angular position of these peaks can be moved by changing the acoustic frequency (around the resonance frequency of the emitter). This is a way of performing an electronic space scanning of an X-ray beam. It is possible to obtain a scan of 1 mm at 1 meter from the crystal with a resolution of the order of 1 Å. Unfortunately, up to now, the minimum width of X-ray beams obtained with Bragg-Fresnel lenses is about 1 µm. Nevertheless, the coupling of these two systems gives some encouraging results on the space scanning of a focused X-ray beam.

It has been shown that the coupling of two surface acoustic wave devices in a Kirkpatrick-Baez scheme provides a way of performing an X-Y scan.

A time modulation of the satellite intensities can be obtained by modulating the surface acoustic wave. The shortest X-ray pulses obtained for a beam width of 10 µm is of the order of 0.1 µs with an efficiency in terms of intensity reaching 50 % of the direct beam. For this, it is necessary to coat a multilayer on the piezoelectric substrate in order to use Bragg diffraction. The time range of these X pulses strongly depends on the time required by the acoustic pulses to cross the irradiated area. This effect can be used to design a high-frequency X-ray beam chopper for time resolved experiments on synchrotrons.

Some memory effects (~ 30 min) occur when a stationary acoustic wave and an X-ray beam interact on the surface of the piezoelectric crystal. This is certainly due to a periodic repartition of charges created by the ionization of the material under the X-ray irradiation.

PS12.03.18 SURFACE ACTIVITY AND AND DIELECTRIC PROPERTIES OF FOLIATED SILICATES. O.V. Roskin, T.E. Moskovskaya, G.T. Timoshenko, Irkutsk State University, Irkutsk, Russia

Dispersed mica is a good object for absorption study of water molecules on the mechanically activated particle surface. Electric properties of the studied samples depend on particle size distribution of powders and are basically, defined by the properties of thin water layers surrounding mica capsule.

Low-frequency dielectric measurement under high dielectric inhomogeneity allow to define the influence of interlayer polarization as well as analyse absorption phenomena taking place in the samples when an external constant electric field acts in the temperature range from 295 K to 430 K.

It has been found out:
1) the smaller particles the shorter of the low-frequency polarization relaxation, but dielectric permeability and angle tangent of the dielectric losses are increasing. These characteristics under normalization of powders damping can be used for the estimation of the particle size distribution;
2) when temperature is increasing angle tagent maximum of the dielectric losses is shifting to the lower frequencies region;
3) damped powders treatment is a constant electric field under 500 V/mm voltage leads to the increase of absorption ability of the investigated samples. Powder is able to hold water films for more a long time. Dielectric losses are essentially decrease. When electric field sign is changing, dielectric characteristics are practically coming back to the basic ones.

PS12.03.19 INTERFACE STRUCTURE OF GaSe / Si(111) STUDIED BY X-RAY STANDING WAVES. B. Capelle*, J.F. Petroff, J.C. Boulliard, A. Koebel, Y. Zheng. Lab. Minéralogie-Cristallographie, Universtiés PARIS VI et PARIS VII, CNRS URA 09, 4 place Jussieu, 75252 Paris Cedex 05, France; *also at LURE, Universtié Paris-Sud, Bat 209D, 91405 Orsay Cedex, France

Recently a renew of interest for GaSe has occured in relation with the so-called Van der Waals Epitaxy (VdWE). In common heterostructures, a low misfit between the lattice constants parallel to the substrate surface is usually considered as a prerequisite. To overcome these constraints Koma *et al.* [1] introduced VdWE between two-dimensional (2D) materials. A 2D material has a layered structure such as GaSe. As there is no strong bonding between layers, the epitaxy of 2D / 2D materials allows the possibility to remove the constraint of the lattice mismatch between the film and the substrate.

More recently the growth of 2D materials was extended on three-dimensional (3D) semiconductor substrates like Si and GaAs. Such epitaxial growth is often referred to as "Van der Waals epitaxy" [2]. Therefore, some evidences from TEM observations [3] suggest that the growth may proceed in two stages: firstly, as in "classical" pseudomorphic epitaxy, half a GaSe layer is bonded to Si by covalent bonds and Van der Waals growth of GaSe layers occurs in a second stage. To check this assumption very thin films (approximately half a layer) of GaSe were grown on H-Si(111) substrates. The X-ray standing waves technique was used to determine the structure of the interface. XSW results confirm the existence of half a GaSe layer at the interface of GaSe / Si(111). The Ga atoms are located in T sites, straight above top Si atoms, with a Si-Ga bond length of 2.37 Å. The position of Se atoms was found to be in agreement with the one calculated from GaSe bulk structure.

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