are packed in columns along the surface normal. This is in agreement with the simulation of experimental rocking curves in which the partial relaxations were considered in every periods of the SLS.
Based on a series of experimental results a relaxed growth mechanism for InGaAs/GaAs SLSs is proposed.

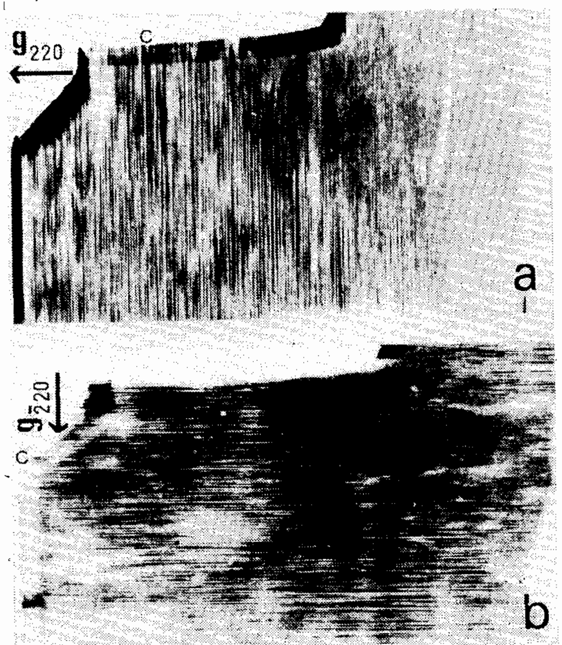

Fig. 1 Anomalous transmission topographs of sample A (a) 220 reflection (b) $\bar{2}20$ reflection.

PS-11.02.18 X-RAY POWDER DIFFRACTION STUDY OF KINETICS OF CRYSTALLIZATION OF PULSED LASER-DEPOSITED $BaTiO_3$ THIN FILMS

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Thin films of $BaTiO_3$ were prepared on unheated Pt substrates using a pulsed excimer laser operating at 193 nm (ArF), 10 Hz repetition rate, 20 ns nominal pulse width, with a laser fluence of ~ 15 J/cm$_2$ and a background oxygen pressure of 13.33 Pa. Following deposition, films were isothermally annealed in air for progressively longer periods of time. Films were examined after each annealing using an x-ray powder diffractometer (theta-two theta) with CuKa radiation and a two-theta compensating slit. The diffractometer was run under computer control with a step size of 0.03 degrees and a counting interval of 1.7 sec. As deposited, films were amorphous, showing only a broad amorphous hump in the x-ray pattern near 28 degrees two-theta. X-ray diffraction did not indicate significant crystallization at temperatures below 500°C. At 550°C, annealing times in excess of 30s were required to produce measurable crystallization. At 750°C, crystallization was extensive after only a few seconds of annealing time. Plots of crystallization (as deduced from the integrated area of the (011) $BaTiO_3$ peak) as a logarithmic function of time show linear relationships. Two rate laws appear to have been operative, with a relatively rapid process dominant at 550° and 600°C, and a more gradual process dominating at 700 and 750°C, for crystallization times greater than 30s. At 650°C, both processes were operative, as judged from a break in slope of the linear trend. Ferroelectric and dielectric properties of the annealed thin films are discussed.

PS-11.02.19
DISTRIBUTION OF CRYSTALLITES IN AMORPHOUS SiO_2 FILM ON Si WAFER AND ITS CHANGE WITH OXIDATION PROCESS.

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Electrical and mechanical properties of amorphous SiO_2 film grown on the Si substrate have been attracted much attention because of an industrial application as an atomically thin insulator on semiconductor devices. As a non-destructive method in investigating the structure of the amorphous phase and its interface, Iida *et al.*(Surface Science, **258**, 1991, pp.235-238) have recently applied the technique of X-ray crystal truncation rod(CTR) scattering and have found extra peaks on the low angle side of the 111 CTR scattering. It has been suggested that some crystalline scatterers exist in the amorphous film. In this paper we show that the profile of the peak strongly depends on the condition of oxidation of Si wafer and the distribution of crystalline scatterers in the amorphous film can be obtained from the analysis of the profile. Three kinds of samples were prepared; normal dry O_2 oxidation heated at 900 degree denoted as Dry-O_2: low temperature oxidation(about 650 degree) with ozone atmosphere denoted as O_3: low temperature oxidation(about 650 degree) under the atmosphere of afterglow of microwave plasma of O_2 molecule denoted as AGMP. X-ray measurement was performed at Beam Line 4C in Photon Factory, KEK Tsukuba. Figure shows the change of the profile of the peak for three samples. Soild curves show the calculation obtained by the least squares fitting where the distribution of the crystalline scatterers in amorphous phase was refined. We found that the distribution depends on the oxidation process. For instance the crystallites exist only at the interface especially for the sample AGMP.
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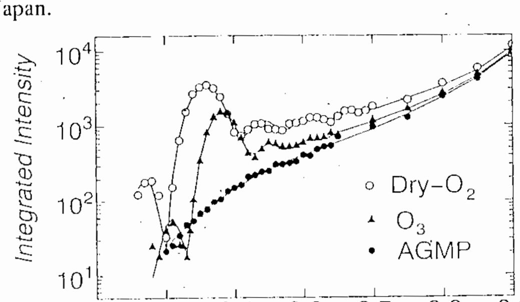

CTR scattering near 111 Bragg point along 001 direction

