07.8–6 THE CONCENTRATIONS IN HETEROEPITAXIAL SILICON ON SAPPHIRE. C Dineen, K S Knight, T Peters, M Pitt and J C Robertson, GEC Research Laboratories, Hirst Research Centre, Wembley, UK.

The surface of heteroepitaxial silicon grown on sapphire substrates exhibits a haze-like appearance. It has been noted that device yield and performance can be correlated with the degree and extent of haze observed on the silicon. Considerable effort has therefore been expended on developing quantitative optical procedures for the assessment of haze. Little has been reported on work aimed at establishing the structural origin of haze.

This contribution describes recent results on the determination of twin concentrations in hetero-epitaxial silicon on sapphire by XRD. Details of the instrumentation employed will be given. It is shown that a correlation exists between twin concentrations and measurements of haze.

07.8–7 THE STRUCTURE OF MBE GROWN $(Ga_{1-x}Al_xAs)n_1$ $(GaAs)n_2$ / GaAs (001) SUPER LATTICES AS DETERMINED BY MEANS OF X-RAYS DIFFRACTION TECHNIQUES. By J. Kervarec, M. Baudet, P. Auvray and A. Regreny, Centre National d'Etudes des Télécommunications, 22301 LANNION FRANCE

The study of the physical properties of the superlattices $(Ga_{1-x}Al_xAs)n_1$ $(GaAs)n_2$ / GaAs (001) requires the knowledge of their structural parameters n_1, n_2 and x and of their crystalline perfection.

For this purpose, two experimental techniques are used a standard powder goniometer and a double crystal diffractometer. The diffraction diagrams directly yield the super period and the average Al concentration in the superlattices The value of x is determined by refinement between observed and calculated structure factors. The results are even more accurate when the number of observed satellite peaks for a given periodicity is greater ; this number depends at the same time on the Al composition x, the n_1 / n_2 ratio, the periodicity and its dispersion and the characteristic features of the interfaces.

This method is illustrated by a few examples. The consequences of various defects (dispersion in n_1 and n_2, super period gradient, Al diffusion) on the X-ray diagrams will be discussed.

07.8–8 КАЛИНИНСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
КАЛИНИН, СССР

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СМИРНОВ Ю.М.

ВЫРАЩИВАНИЕ МОНОКРИСТАЛЛОВ БОЛЬШИХ РАЗМЕРОВ ИЗ РАСПЛАВОВ

Монокристаллический германий обладает хорошими оптическими, механическими и химическими свойствами и находит применение в приборах, работающих в инфракрасной области спектра [I].

Нами изучались возможности получения монокристаллов германия с большой площадью поперечного сечения. В результате были последовательно получены монокристаллы с диаметрами I60, 200 и 300 мм [2-3]. Решение уравнения, предложенного в работе [4]

$$\alpha\beta^2x^5-\beta^2x^4-2\alpha\beta x^3+2\beta x^2+\gamma^2\alpha x-1=0,$$

где x – соотношение радиусов кристалла и расплава,
α,β,γ – функции свойств вещества и условий процесса роста, показало, что диаметр растущего кристалла обратно пропорционален квадрату температурного градиента в расплаве. Проверка этого результата проводилась на монокристаллах германия. Расчеты показали, что для выращивания монокристаллов диаметром 500 мм величина градиента температур в расплаве не должна превышать 40 К·м$^{-I}$, что трудно выполнимо.

Тем не менее точное соблюдение температурного и кинематического режимов процесса роста, позволило вырастить монокристаллы германия диаметрами 400–500 мм и весом более 40–50 кг.

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07.9–1 CHARACTERIZATION OF THE $BaLaGa_3O_7$ SINGLE CRYSTALS GROWN BY CZOCHRALSKI METHOD. By G.Jasiolek, M.Berkowski and Wl.Piekarczyk, Institute of Physics of Polish Academy of Sciences, Warszawa, Poland.

The single crystal samples cut from the Czochralski growth $BaLaGa_3O_7$ crystals have been the subject of our investigations (Wl.Piekarczyk,M.Berkowski,G.Jasiolek, submitted to the J.Crystal Growth). The samples were prepared in the slice form with the surfaces parallel or perpendicular to the growth axis of the crystals, [001]. These samples were extracted from the part of the crystals with the convex crystallization front as well as from the part with the flat front. The morphology of the samples were revealed by the X-ray topography and the SEM techniques. These techniques permitted to detect few regions of the crystals which differ from surroundings. Particular attention was paid to the melt -back region as well as to the skin and core regions of the crystals. The observations of the changes of the lattice parameter "c" up to 0.0003nm were carried out using photographically modified Popovic method (J.Appl Crystall., (1971),4,240). The lattice parameters mapping along one of the crystals has been done using Bond method (Acta Cryst.,(1960),13,330). The concentrations of the gallium, barium and lanthanium as well as the level of distribution homogeneity of these elements were measured in the different regions of the crystals using the Electron Microprobe Analyzer. The increase of the gallium concentration was confirmed in the core region of the crystals. A slight increase of the barium concentration was observed in this region, too. It was found that the distribution of lanthanium is homogeneous in the whole crystal. The barium and gallium distributions are homogeneous out of inter-regions. Vickers microhardness was measured in the selected regions of the crystals, for the different orientations of the specimen