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# THE IMPACT OF THE METHOD OF UNDERLAY SURFACE PROCESSING ON THE DEVELOPMENT OF DEFECTS IN EPITAXIAL COMPOSITIONS

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One of the main parameters characterizing the quality of EC is the density of dislocation and other structural defects. Great impact on the development of defects during epitaxial growth is produced by the quality of underlay preparation before that. Multiple research of relatively thin (less than 20-30 microns) epitaxial layers [2,3] demonstrated, that contamination or damages of underlay surface cause the development of defects of wrapping, counterparts, macroscopic protuberances in the growing layer. Therefore in inverted epitaxy it is the problem of the development in the course of defects growth not in epitaxial layer, but in underlay, that becomes the major one. The processes of the development of defects in underlay in the course of growing thick (approximately 300 microns) epitaxial layer are scarcely researched by now. Scientists sustained the idea that when using dislocation-free underlays for growing in the working layer of ISS there are dislocations with the density of $10^3$ $sm^{-2}$ and more.

Underlays underwent various methods of operator side surface (on which the growth took place) processing: chemical mechanical polishing (CMP) with 1-2 mcm and 20 mcm of removed layer, mechanical polishing (MP) with diamond paste with abrasive grit of 1,0 mcm and 0,5 mcm. Methods of processing of rear underlay sides were also different: chemical mechanical polishing, grinding, gettering – grinding with loose abrasive followed by shallow mechanical polishing. After growing the ISS were ground and polished both sides with CMP method to get 80 mcm of operator side of underlay and 170-180 mcm of grown layer side.

It was proved that in all examined ISSs operator layer contains dislocations, which density lies in the interval of $3*10^2$ - $4*10^3$ $sm^{-2}$ , thus worked-out technology of growing will ensure relatively high level of structural perfection of ISS. Nevertheless there is still a potential for further improvement of ISS quality, one of them being, as it is obvious from the Table 1, the improvement of the way of mechanical processing of underlays surface. In the cases when operator side of an underlay underwent chemical mechanical polishing, the density of dislocations in underlay after growing was in average lower compared to one after mechanical polishing. The exception is underlays with ground rear side. The best results were obtained by the authors in the course of CMP method application with enlarged to 20 mcm width of removed layer of $3*10^2$ $sm^{-2}$.

The empirical results obtained leads to the conclusion that it is advisable to apply dislocation-free underlays without micro-defects stripes of A-type for the production of PhT on EC basis with low density of dislocations. Under all equal conditions the best quality of EC is achieved by means of thorough chemical-mechanical polishing of operational side of underlay and gettering of the rear side.

LITERATURE

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