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THE INFLUENCE OF NITROGEN PRE-IMPLANTATION ON THE PROPERTIES OF He IMPLANTED MATERIALS

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The influence of a surface layer of implanted nitrogen on the properties of titanium hydride further implanted by He was investigated. Samples were implanted with 45 keV N_2^+ ions/cm² to a total dose of 1.25×10^{17} ions/cm² at room temperature. These samples, as well as identical samples not irradiated by N_2 ions, were implanted with He ions at energies of 25 keV and 45 keV to doses ranging from 2×10^{17} to 5.5×10^{17} ions/cm². He release from the implanted samples was increased by a factor of 2-4 in nitrogen implanted samples. Nitrogen implantation also induced surface erosion and blistering at lower He fluences than in samples not irradiated by N_2 . It seems that radiation damage caused by N_2 implantation suppresses the possible enhancement of the irradiation resistance due to surface nitrogenation.

THE USE OF DCD FOR STRUCTURAL PROPERTIES CHARACTERIZATION OF SUBSTRATES AND LAYERS OF II-VI COMPOUNDS

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Alloys of II-VI compounds are important semiconductors for infrared device applications. Structural imperfections are considered to be responsible for the low yield and performance of infrared devices made of these materials. The double crystal diffractometer (DCD) is a powerful tool for studying the crystalline quality of nearly perfect crystals. By applying this technique to layers and substrates of II-VI compounds, the following results were obtained.

- a) Most of the CdTe (CT) and CdZnTe (CZT) substrates taken from various sources have low angle grain boundaries.
- b) The structural quality of HgCdTe (MCT) layers grown by the liquid phase epitaxy (LPE) method is worse than that of their substrates.
- c) The number of defects induced in HgZnTe epilayers grown on CT and CZT substrates increases with increasing lattice mismatch between the layer and its underlying substrate.

Two additional phenomena were measured and analyzed during this study: a coherent strained layer of MCT grown on a CT substrate, and misorientation between an MCT layer and its CT substrate.

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