Walery Kolkowski @ Technical University Dresden

During my visit at the Technical University in Dresden I was involved in realisation of the project concerning investigation of the electrical and structural properties of hydrogen-related defects in CdTe grown by the molecular beam epitaxy (MBE) technique.

The main purpose of the measurements was to investigate the electrical and structural properties of dominant hydrogen-related defects introduced by a dc H plasma treatment in n-type CdTe grown by the MBE technique. The p-type CdTe/n-type GaAs junctions were grown at the Institute of Physics Polish Academy of Science by the MBE technique. Hydrogen was introduced by a dc H-plasma treatment at different temperatures at the Technical University Dresden. Schottky contacts were fabricated by thermal evaporation of gold on as grown CdTe and CdTe after H-plasma treatment structures. The quality of all contacts was checked by current-voltage (IV) characteristics at different temperatures at the Technical University Dresden. The diodes with a good rectifying behaviour were used for the electrical characterisation by capacitance-voltage (CV), deep level transient spectroscopy (DLTS) and Laplace DLTS measurements in order to understand the origin of H-related defects introduced by a dc H plasma treatment. The results of I-V, C-V and DLTS measurements demonstrated the high quality of our diodes with high rectification ratios, small leakage currents. However, the IV curves showed that the thermionic mechanism was not dominant in these samples and the tunnelling of carrier through a thin insulating layer between CdTe and GaAs or barrier inhomogeneity should be taken into account. The carrier concentration in p-type CdTe was about 2×10^{15} cm^{-3} as obtained from the CV measurements at room temperature. In order to observe the presence of deep level defects which could act to as recombination/generation centres in *p*-type CdTe conventional DLTS measurements were performed. One broad DLTS peak dominated the spectrum, which could be characteristic for extended defects in our samples at around 3-4 µm from the interface. It makes sense because of the lattice mismatch between ZnTe and GaAs (around 7%) may induce a high defect density close to the interface. This hypothesis should be confirmed by further studies.