Structural Anisotropy of MBE-grown CdTe/SnTe/CdTe//GaAs(001)

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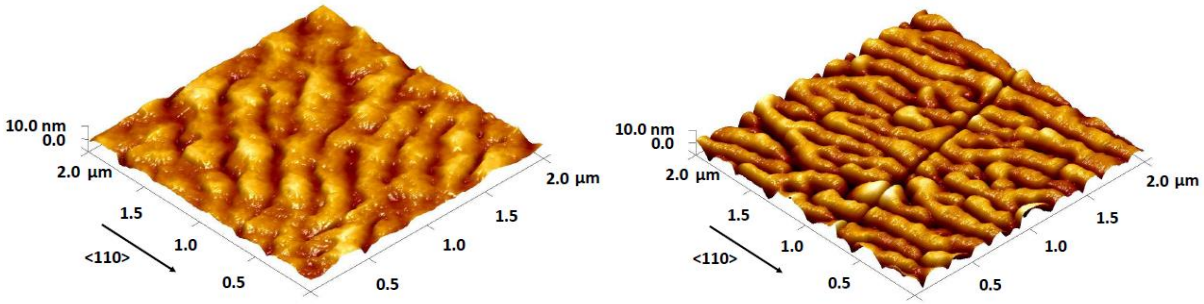
SnTe belongs to a new and currently investigated class of materials named topological crystalline insulators, which are interesting due to many properties, important especially from the point of view electronics and spintronics development [1-4].
The object of our research were SnTe(001) layers deposited by MBE technique on GaAs substrate 2° off-cut toward [100] direction with 4 μm CdTe(001) buffer layer. SnTe layers had various thicknesses, in a range of 20-1000 nm. Each sample had a 50 nm CdTe cap. Investigated samples were grown mainly at 310 °C, at a variable Te/SnTe molecular flux ratio. The aim of investigation was performing a study of the samples surface morphology and crystallographic quality.
As the experimental techniques atomic force microscopy (AFM) and high-resolution X-ray diffraction (Philips X'Pert MRD diffractometer with $CuK_{\alpha 1}$ radiation) were used.
The results indicate, that the samples' surface is faceted into ridge-and-valley structures close to <110> or <100> crystallographic directions (Fig. 1). The differences between the directions of the structures was found to be related rather to Te/SnTe molecular flux ratio than to GaAs off-cut direction and the layers misorientation.



a) b)

Fig. 1. AFM images of ridge-and-valley structures of samples containing 1-μm-thick SnTe grown at high (a) and low (b) Te/SnTe molecular flux ratio.

[1] T.H. Hsieh et al., *Nature Communications* **3,** 1 (2012).
[2] P. Dziawa et al., *Nature Mat.* **11,** 1023 (2012).
[3] J.E. Moore, *Nature* **464,** 194 (2010).
[4] R. Ishikawa et al., *Journal of CrystalGrowth* **453,** 124 (2016).