# Comparison of Defect Structures in Microgravity ($\mu$g) and Terrestrially (1g) Grown CdZnTe Single Crystals by Synchrotron White Beam X-ray Topography *

X19C

B.Raghothamachar, H. Chung, M. Dudley, and D. Larson Jr. (SUNY, Stony Brook)

In a microgravity environment, gravity-dependent effects such as buoyancy, convection and hydrostatic pressure are minimized and diffusion controlled non-wetting growth can be achieved resulting in reduced stress generation which in turn minimizes the occurrence of twinning and deformation. CdZnTe wafers sliced from boules grown in microgravity and in normal gravity conditions were characterized by synchrotron white beam x-ray topography. Figure 1 shows a transmission topograph ($\mathbf{g}$ = $\bar{1}\bar{1}3$, $\lambda$= 0.42 Å) recorded from wafer no.4 sliced from the steady state growth region of microgravity grown boule GCRC-2. The image shows a very low dislocation density ($5X10^2$-$1.2X10^3/cm^2$) with individual dislocations (**D**) being clearly resolved. Other defects observed are Te precipitates revealed by singular dark spots(**P**) and lamellar 180° rotation twins(**T**) about the ($11\bar{1}$) plane normal. Figure 2 shows a transmission topograph ($\mathbf{g}$ = $\bar{1}\bar{1}3$, $\lambda$= 0.42 Å) taken from a sample sliced from NDVDT-3 which was grown under identical growth conditions except for gravity. Slip bands generated from the peripheral regions are clearly visible. The sample shows a very high dislocation density of the order of $10^5$-$10^6/cm^2$. Clearly, the microgravity samples show much higher structural perfection than ground-based samples due to minimization of growth stresses.

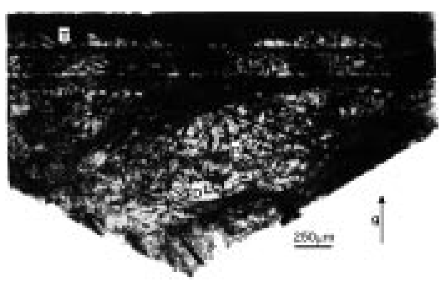


Figure 1.

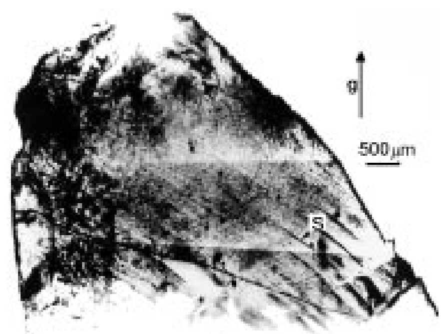


Figure 2.

* Work performed on the Synchrotron Topography Project, Beamline X-19C, NSLS, BNL and supported by NASA Marshall Space Flight Center