

# GROWTH OF CdZnTe FOR DETECTOR APPLICATIONS

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CdZnTe alloys are one of the most important and strategic materials for application in space, security and medical applications. Hundreds of papers are annually published on this topic, where the bottleneck is still the high quality material needed for its applications. Nevertheless, if one takes a look in the recent publications carried out in the last years, it seems that we have nearly reach the top in the research of bulk CZT crystals and now it is the time of the industry to incorporate all the technological and scientific advances from the research world.

In this talk a review will be done about the recent developments which have been carried out in the growth of bulk CdZnTe crystals by Bridgman and Vertical Gradient Freezing Growth methods with the use of cold fingers to improve the solid liquid interface and with the application of the superheating process to reduce the Te inclusions generally present in the CdZnTe bulk detectors. At the same time, a discussion will be done about the Travelling heater method with the advantages and disadvantages for their use. Furthermore, the results of simulation will be incorporated in the presentation to give new look inside the problems in the growth preparation.

A second topic which it will be discussed is the presence of defects in CZT crystals which reduce the possibilities for using the material as bulk detector. More precisely the presence of Te inclusions will be discussed and the method on the growth and in postgrowth annealing processes as an important road for reducing the number of inclusions, or at least to reduce the Te inclusion size which do not deteriorate the detector application.

On the other side, the surface and contacts preparation of bulk CZT crystals to be used as detectors is other important step to be considered. One of the first questions is to know the effect of the lateral edges of the samples prior to be used as detectors, and the important role of the selected face which must be used as cathode or anode for the device preparation. The final conclusion in this topic will be the behaviour of the CZT as detector in the selected energy range.

In summary, after a brief introduction of CZT as detector radiation based on their physical and chemical application, a presentation of the state of the art of the bulk crystal growth processes will be done, where the focus will be about the presence of defects which deteriorate the application as detector, which it will be followed by the analysis of the current problems in the last step of the material for real application.

All these topics will be analysed in view of the most recent papers published in this field in the last quinquenium, and at the same time this presentation will be based on the four Doctoral Thesis which have been successfully completed in the last triennium in the Crystal Growth Lab (cgl) of Madrid ([www.uam.es/cgl](http://www.uam.es/cgl)).