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Floating-zone growth of CdMnTe crystals and their characterization as room-temperature semiconductor gamma-ray detectors[1] T.S. LIU, F.Y. WANG, A.E. BOLOTNIKOV, G.S. CAMARDA, Y. CUI, A. HOSSAIN, U. ROY, K. LEE, G. YANG, R. JAMES, G.D. GU, Brookhaven Natl Lab — CdMnTe (CMT) is a promising candidate for room-temperature semiconductor gamma-ray detectors. In the past, several groups have grown detector-grade CMT material by using a low-pressure Bridgman method. The performance of the test devices fabricated from CMT crystals was found to be slightly lower to that achieved with CdZnTe detectors. For example, the best electron mu-tau product reported for CMT was about 5 times lower compared to that achieved for the best commercial CZT material. Also, the crystal quality of the CMT crystals was reduced due to strong twinning, presence of subgrain boundaries and, in some cases, Te inclusions. Here, we report on our attempt to grow CMT crystals by using a modified floating-zone growth technique, which has not been used previously to grow CMT crystals. There are several advantages of this technique over the traditional Bridgman methods: a higher purity of as-grown crystals, better doping control, more stable growth conditions with uniform compositional distribution, and a better control of the seeding and morphology of the growing crystal. We present the new growth technique and results from CMT crystal characterization and device testing.

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Genda Gu
Brookhaven Natl Lab

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