Abstract Submitted
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In-situ proton radiography of solidification in Sn-Bi, Al-Cu, Al-In and Bi-Ga melts[1] JASON COOLEY, AMY CLARKE, CHRISTOPHER MORRIS, BRIAN HOLLANDER, TIM TUCKER, Los Alamos National Laboratory, THOMAS OTT, Florida State University, ROBERT FIELD, DAVID KORZEKWA, DUNCAN HAMMON, KESTER CLARKE, PATRICK KENNEDY, FRANK MERILL, FESSAHA MARIAM, Los Alamos National Laboratory, MARTHA BARKER, New Mexico Institute of Mining and Technology, JAMES FOLEY, ROBERT AIKIN, JOSHUA HILL, DAN THOMA, Los Alamos National Laboratory, FINIAN O'NEILL, Boston College, MEGAN EMIGH, New Mexico Institute of Mining and Technology, BO FOLKS, Los Alamos National Laboratory — In-situ observation of the solidification phenomena in metals can lead to better understanding and control of microstructure evolution. Proton radiography offers the ability to image thick samples of high z material. Recently, in-situ proton radiography was used to directly observe dynamic processes during melting and solidification in bulk binary alloy systems. The spatial resolution was ∼65 microns for a 44 x 44 mm2 field of view. The time scale of each experiment was 2 to 6 hours. The data collected allowed for the determination of solidification front velocities, captured the changes in solid/liquid densities and showed evidence of convective fluid flow in the melt. Microstructural features larger than approximately 100 microns in the solid phase were observed.

[1]Work at Los Alamos suported by NNSA and the Department of Energy

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