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Measurements of the Dynamic β–γ Phase Boundary in Tin[1] JEAN-PAUL DAVIS, DENNIS B. HAYES, Sandia National Laboratories, Albuquerque NM 87185 — Experiments performed on the Z machine at Sandia Labs used magnetically generated planar ramp waves to quasi-isentropically compress pre-heated solid tin across the equilibrium β–γ phase boundary. Velocity history measurements at a tin/window interface exhibited features that could be consistently related, through simulations, to the β–γ structural transformation occurring in the bulk tin. The simulations used a homogeneous phase-mixture model with a γ-phase energy offset that was adjusted to match the measured velocity feature. This determined the phase-boundary pressure from experiment and the phase-boundary temperature from the β-phase equation of state. Due to wave interactions, measurements using sapphire windows were more difficult to interpret than those using LiF windows and thus led to results with larger uncertainty. The measured phase boundary pressure did not depend on the tin's initial microstructure, nor on perturbations to the wave profile arising from the difficulty of pre-heating a soft metal in the isentropic compression configuration.

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