Abstract Submitted
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Temperature and pressure determination of the tin melt boundary from a combination of pyrometry, spectral reflectance, and velocity measurements along release paths[1] BRANDON LA LONE, National Security Technology, PAUL ASIMOW, OLEG FATYANOV, Caltech, ROBERT HIXSON, GERALD STEVENS, National Security Technologies — Plate impact experiments were conducted on tin samples backed by LiF windows to determine the tin melt curve. Thin copper flyers were used so that a release wave followed the 30-40 GPa shock wave in the tin. The release wave at the tin-LiF interface was about 300 ns long. Two sets of experiments were conducted. In one set, spectral emissivity was measured at six wavelengths using a flashlamp illuminated integrating sphere. In the other set, thermal radiance was measured at two wavelengths. The emissivity and thermal radiance measurements were combined to obtain temperature histories of the tin-LiF interface during the release. PDV was used to obtain stress histories. All measurements were combined to obtain temperature vs. stress release paths. A kink or steepening in the release paths indicate where the releases merge onto the melt boundary, and release paths originating from different shock stresses overlap on the melt boundary. Our temperature-stress release path measurements provide a continuous segment of the tin melt boundary that is in good agreement with some of the published melt curves.

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