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RAPID UNDERCOOLING AND REFREEZE IN LASER-SHOCK-MELTED BI(ZN)

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Rapid undercooling and refreeze in laser-shock-melted Bi(Zn)

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We completed experiments in which we used a high-power laser to shock-melt a Bi(Zn) alloy and refreeze it in the shock release wave. We recovered the samples post shot for microscopic analysis and compared our results with the results from similar prior experiments with pure Bi. The targets in both sets of experiments were four-layer targets composed of BK7 glass, Al, the elemental Bi or Bi(Zn) alloy, and a transparent diagnostic window. There is conductive heating of the Bi through the Al layer from the hot plasma at the Al/BK7 boundary that depends on the Al thickness. Since the Bi(Zn) targets had a much thicker Al layer than did the Bi targets, the two sets of targets had somewhat different thermal histories even though they were driven to the same pressure. In this presentation we compare the resolidified Bi(Zn) microstructure to that of the Bi, accounting for the different thermal histories.

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