

Abstract Submitted
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Using THOR to manipulate the homogeneous phase transition and nucleation rates in freezing water ERIN NISSEN, University of Illinois at Urbana-Champaign, DANIEL DOLAN, Sandia National Laboratories — Water undergoes a rapid, first-order phase transition under quasi-isentropic compression to form polycrystalline ice VII. Prior research on this topic has focused on probing the kinetics of solidification by concentrating on two factors: peak pressure, and window material. Less attention has focused on the effects of (1) elevated initial temperature, which forces the kinetics to follow a different isentropic loading path and (2) the variation in ramp rate, reported in this study. Dynamic freezing in water was found to be affected by both conditions. Increasing the initial sample temperature pushed the metastable transition limit to higher pressures, while slower compression lead to slower nucleation rates. Sandia National Labs is managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a subsidiary of Honeywell International, Inc., for the U.S Dept. of Energy's National Nuclear Security Administration under contract DE-NA0003525.

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