Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

In situ X-ray diffraction of shock-compressed diamondoid SOVANNDARA HOK, SULGIYE PARK, Stanford University, ARIANNA GLEASON, SLAC National Accelerator Laboratory, SUZANNE ALI, Lawrence Livermore National Laboratory, DYLAN RITTMAN, Stanford University, FENG KE, JEREMY DAHL, ROBERT CARLSON, ERIC GALTIER, SLAC National Accelerator Laboratory, NIR GOLDMAN, Lawrence Livermore National Laboratory, WENDY MAO, Stanford University, YU LIN, SLAC National Accelerator Laboratory — Diamondoids are a unique class of materials with a general chemical formula of $C_{4n+6}H_{4n+12}$ and have hydrogen terminated structures superimposable onto a diamond lattice. Static compression of lower diamondoids (ada-, dia- and tria-mantane) revealed diamond synthesis at significantly reduced transformation energy compared with conventional carbon phases. For instance, at 15 GPa, triamantane transforms to diamond at 1200 K, while >2000 K is required for graphite-to-diamond transition [1, 2]. We investigated the effects of polymorphism and intermediate phases on the diamondoid-to-diamond transformation using laser-driven shock compression in the Matter in Extreme Conditions end-station at the Linac Coherent Light Source. Subpicosecond time-resolved X-ray diffraction on four diamondoids allowed for direct structural characterization of intermediate phases that lead to diamond transformation. Our preliminary results show pressure-induced amorphization of diamondoid before recrystallization to diamond. [1]T. Irifune *et al.*, Physics of the Earth and Planetary Interiors **143–144**, 593 (2004). [2] S. Park *et al.*, manuscript submitted

Sovanndara Hok
Stanford University

Date submitted: 18 Mar 2019 Electronic form version 1.4