Shock Crystal Growth of Water in Dynamic-DAC.\(^1\) CHOONG-SHIK YOO, LLNL, WILLIAM EVANS, GEUN-WOO LEE — While diamond anvil cells (DACs) and gas-guns are capable of generating high pressures to 300-400 GPa, the precise and tunable control of de/compression rates has been a formidable challenge to both static and dynamic high-pressure research. Furthermore, the pressure-induced polymerization, amorphorization, and diffusion controlled crystal growth occur at an intermediate time scale (micro-to-millisecond) of conventional shock and static experiments, for which no compression technology is readily available for in-situ studies. To address this situation, we have recently developed dynamic-DAC (d-DAC) capable of precise controlling of pressure and compression rates at high static pressures. Coupling with time-resolved synchrotron x-ray, optical microscopy, and laser spectroscopy, d-DAC enables one to measure time-resolved structural evolutions of a sample across melting and other phase transitions. In this paper, following the brief description of dynamic-DAC, we will present our recent observations in d-DAC including shock crystal growth of ice VI dendrites and ice VII metastably grown from the stability field of ice VI.

\(^1\)This work has been performed at Lawrence Livermore National Laboratory, University of California under the auspices of the U.S. Department of Energy under Contract No. W-7405-ENG-48.

Choong-Shik Yoo  
LLNL

Date submitted: 01 Mar 2007  
Electronic form version 1.4