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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.

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