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The effect of dynamic compression on phase transformation: Solidification of water and crystal growth of ice VI using dynamic diamond anvil cell[1] GEUN WOO LEE, WILLIAM EVANS, CHOONG-SHIK YOO, Lawrence Livermore National Laboratory — The kinetics of phase transformation depends on how driving parameters are applied. Under high pressure, compression rate can give different paths of phase transformation. For this purpose, we have developed a new device, called dynamic diamond anvil cell (d-DAC), which can modulate a given static pressure with various compression rate and type. Using d-DAC, liquid water can be overpressurized up to 75 % in ice VI phase field without crystallization, and after transforms to metastable iceVII phase in the stable ice VI pressure field. Interestingly, when fast sinusoidal compression is applied, the crystal morphology of ice VI surrounded by liquid water dramatically changes to fractal and dendritic shape. In this talk, we will describe the details of crystallization, following a brief description of the technical development of d-DAC.

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