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A shock pressure induced phase transition from liquid to solid of cyclohexane using time-resolved coherent anti-Stokes Raman spectroscopy SHIRO OGUCHI, AKIRA SATO, KEN-ICHI KONDO, KAZUTAKA NAKAMURA — The liquid-solid phase transition of cyclohexane has been studied under laser shock compression up to 3.8 GPa by using nanosecond time-resolved Coherent Anti-stokes Raman Spectroscopy (CARS) and laser shock compression. The shock wave is generated by irradiation of 10 ns pulsed laser beam on the plasma confinement target and its pressure is estimated from a particle velocity, which is measured by optically recording velocity interferometer system (ORVIS). Higher frequency shift of the Raman peaks (ring-breathing, C-C stretching, and CH_2 twist modes) was observed at high pressure. At 3.8 GPa, splitting of the peak (CH_2 twist mode) due to change in symmetry of surrounding molecules, which corresponds to phase transition to solid IV, was observed at delay time of 20 ns. Rapid liquid-solid phase transition has been directly observed to occur within 20 ns.

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