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Temporal change of Raman spectra of carbon tetrachloride under laser-driven shock compression. KUNIHIKO WAKABAYASHI, TOMOHARU MATSUMURA, YOSHIO NAKAYAMA, Research Center for Explosion Safety, National Institute of Advanced Industrial Science and Technology (AIST), EISUKE YAMADA, MITSUO KOSHI, Department of Chemical System Engineering, School of Engineering, The University of Tokyo — Nanosecond time-resolved Raman spectroscopy has been performed to study a molecular response of carbon tetrachloride under laser-driven shock compression at laser power density of 5 GW/cm^2. Shock wave was generated by using the glass-confined geometry target. Intense Raman bands of CCl_4 at 217, 314, and 460 cm^{-1} in the Stokes and anti-Stokes region were clearly observed simultaneously at single-shot experiment. The most intense Raman band of CCl_4 at 460 cm^{-1} showed red shift (18 cm^{-1} at maximum), and its intensity increased along with the propagation of shock wave. The anti-Stokes and Stokes ratio increased during shock compression due to the shock induced temperature rise. The relationship between the change of Raman band and the propagation of shock wave will be discussed by using the hydrodynamic simulation and the measured particle velocity of shock compressed CCl_4.

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