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Shock response to solid germanium KOHEI MIYANISHI, NORIMASA OZAKI, TAKESHI MATSUOKA, SATOSHI MATSUYAMA, KENJIRO TAKAHASHI, HIDEAKI HABARA, TATIANA PIKUZ, ANATOLY FAENOV, KAZUTO YAMAUCHI, RYOSUKE KODAMA, Osaka Univ, KAZUO TANAKA, ELI-NP, YUSUKE SETO, Kobe Univ, YOSHINOBU TANGE, JASRI, TOSHINORI YABUUCHI, YUICHI INUBUSHI, TADASHI TOGASHI, MAKINA YABASHI, TETSUYA ISHIKAWA, RIKEN, MICHEL KOENIG, TOMMASO VINCI, CNRS-Ecole Polytechnique, TAKUO OKUCHI, Okayama Univ, NICHOLAS HARTLEY, HZDR, OSAMI SAKATA, NIMS, TOSHIMORI SEKINE, HPSTAR, EMMA MCBRIDE, SLAC — We present a study of shock response to a solid germanium using in-situ femtosecond x-ray diffraction showing anomalous elastic, normal elastic and inelastic deformations. A 3 ns 532 nm laser pulse was used to apply shock stress to a single-crystalline germanium sample along $\langle 001 \rangle$ direction. SACLA x-ray pulse (7 fs, 10 keV), diffracted from the stressed sample, was recorded by a 2D detector. We observed uniaxial deformations with the strain higher than reported Hugoniot elastic limit (HEL) and with the strain corresponding to HEL, and non-uniaxial deformation. These results indicate that a complex strain structure constituting anomalous elastic, normal elastic and inelastic deformations occur in the shocked germanium.

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