

Abstract Submitted
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Ultrafast XFEL diffraction measurements of femtosecond laser-driven shock-compressed iron TOMOKAZU SANO, NORIMASA OZAKI, TOMOKI MATSUDA, RYOTA KASHIWABARA, NORIHIRO MATSUYAMA, HIROYUKI URANISHI, KAZUKI NAKATSUKA, YOSHIHIKO KONDO, TAKESHI MATSUOKA, Osaka University, YUJI SANO, Toshiba Corporation, YOSHIHIKO TANGE, Ehime University, TOMOKO SATO, TOSHIMORI SEKINE, Hiroshima University, KAZUTO ARAKAWA, Shimane University, TADASHI TOGASHI, KENSUKE TONO, Japan Synchrotron Radiation Research Institute, YUICHI INUBUSHI, TAKAHIRO SATO, MAKINA YABASHI, RIKEN, OSAMI SAKATA, National Institute for Materials Science, AKIO HIROSE, RYOSUKE KODAMA, Osaka University — We measured lattice dynamics under femtosecond laser-driven shock-induced phase transition in iron using X-ray free electron laser with sub-picosecond temporal resolution. Sluggish behavior of iron under shock-induced bcc to hcp transition is the unsolved issue although the diffusionless type of structural transition should be completed within picoseconds. We performed in-situ XRD at SPring-8 Angstrom Compact free electron Laser (SACLA) facility to take a series of snapshots of diffraction patterns under the transition in iron using XFEL pulse with pulse duration of 10 fs varying the delay time from the pumping femtosecond laser pulse. The evolution of lattice defects and high-pressure phase will be addressed in the talk.

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