Abstract Submitted
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XFEL diffraction of engineering materials under dynamic loading by nanoseconds laser pulse at SACLA[1] YUJI SANO, Toshiba, TOMOKAZU SANO, NORIMASA OZAKI, Osaka Univ., TOSHIYUKI FUJITA, KEIICHI HIROTA, SHIGEKAZU MIYASHITA, Toshiba, TOMOKI MATSUDA, HIROYUKI URANISHI, RYOTA KASHIWABARA, YOSHIHIKO KONDO, TAKESHI MATSUOKA, Osaka Univ., KAZUTO ARAKAWA, Shimane Univ., TAKAFUMI ADACHI, MAYU HASHIMOTO, FHI, YUICHI INUBUSHI, TAKAHIRO SATO, KANADE OGAWA, MAKINA YABASHI, RIKEN, TADASHI TOGASHI, KENSUKE TONO, JASRI, OSAMI SAKATA, NIMS, KOICHI AKITA, JAEA, KIYOTAKA MASAKI, ONCT, KAZUO A. TANAKA, RYOSUKE KODAMA, Osaka Univ. — Laser-induced plastic deformation imparts compressive residual stress and enhances the reliability of components. The authors studied the dynamic behavior of materials with XFEL during the plastic deformation. Foil of aluminum alloy was stuck on an acrylic plate with vacuum grease, through which a laser pulse of an Nd:YAG laser were irradiated. XFEL with energy of 10 keV impinged on the opposite free surface of the foil with various delay time and the diffraction was recorded with a two-dimensional detector (MPCCD). When the impulsive wave arrived at the opposite surface, the diffraction pattern obviously changed from spotty to a smoother ring pattern, suggesting the fragmentation of coarse grains. Shifts of diffraction angles were also observed.

[1]The XFEL experiments were performed at the BL3 of SACLA with the approval of the Japan Synchrotron Radiation Research Institute (JASRI) (Proposal No. 2012A8012 and 2012B8011).

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