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High-pressure phase synthesis of Si using femtosecond laserdriven shock wave TOMOKAZU SANO, MASASHI TSUJINO, NORIMASA OZAKI, TOMOAKI KIMURA, RYOSUKE KODAMA, AKIO HIROSE, Graduate School of Engineering, Osaka University, Japan, OSAMI SAKATA, Japan Synchrotron Radiation Research Institute / SPring-8, MASAYUKI OKOSHI, NARUMI INOUE, National Defense Academy of Japan — High-pressure phases of silicon are synthesized using femtosecond laser-driven shock wave. The crystalline structure in a recovered sample was determined using synchrotron x-ray diffraction and electron diffraction methods. The high- pressure phase with simple hexagonal structure exists in the recovered sample. The metastable BC8 structure also exists. The temperature profile in the shock wave as a function of the pressure was estimated using the thermodynamic theory. The estimated results agree well with the experimental results.

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