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Characterization of shock-loaded nanocrystallite silicon powder HIROAKI KISHIMURA, HITOSHI MATSUMOTO, National Defense Academy — Shock compactions of nanocrystallite silicon powder with an average particle size of 50 nm were performed using a propellant powder gun. A copper plate 30 mm in diameter was accelerated to a copper capsule with an infill of nanocrystallite silicon powder pressed to 40% of the theoretical maximum density. The pressure generated in silicon powder was calculated to be below 3.6 GPa. The products of shock compression were examined by X-ray diffraction (XRD) analysis and Raman spectroscopy. The shocked samples were well consolidated, but the color of the samples changed from yellow to gray. No additional peak other than the diamond structure of silicon was observed in the XRD traces and Raman spectra. The particle size of the shocked nanocrystallite silicon was larger than that of the starting powder. Such coarsening may be enhanced by shock-induced heat.

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