

Abstract Submitted
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Study of Shock-Induced Phase Transformations in Silicon using Ultrafast Dynamic Ellipsometry DAN EAKINS, CINDY BOLME, SHAWN MCGRANE, DAVID MOORE, Los Alamos National Laboratory — The kinetics of shock-induced phase transformations are currently being investigated using ultrafast dynamic ellipsometry (UDE), which measures relative changes in optical phase and reflectivity. In this work, thin films (400 nm - 1.5 μm) of crystalline and amorphous silicon are shock-compressed using a Ti-sapphire, shaped-pulse ultrafast laser system. UDE and an accompanying thin-film analysis are employed to track the motion of the shock-front, and provide evidence of structural phase transformations and/or metallization transitions in silicon. Results suggest a complex time-dependent change in the dielectric function within the 250 ps diagnostic lifetime, indicative of transformation kinetics.

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