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Effects of Processing Techniques on the Shock Response of Be

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Microstructural effects including material anisotropy, impurities, grain size, and texture alter a materials response to dynamic loading through wave front dispersion and inelastic processes. The spatial variations created by these effects may ultimately prevent significant energy gain from being attained with inertial confinement fusion (ICF) due to instability seeding if they are not minimized through material processing. To this end, laser-driven confined shock experiments have been conducted on Be to characterize its dynamic strength properties and usefulness as a possible ICF ablator. Disks of Be 3 mm in diameter and 100 to 250 microns thick in the form of single crystal, rolled foil, equal channel angular extruded, and sputtered Be-Cu were dynamically loaded to 100's kbar while the material behavior was measured with *in-situ* diagnostics. Clear two-wave structures were observed in free surface velocity records providing a comparison of flow stress and other dynamic properties between Be types. 2-D continuum mechanics simulations were used to elucidate the underlying physics involved in the dynamic material response of the shocked Be.

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