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Study of material properties under extreme pressure and strain rates using laser driven ramped drives[1] HYE-SOOK PARK, BRUCE REMINGTON, JOEL BERNIER, RICHARD BECKER, ROBERT CAVALLO, STEVE POLLAINE, LLNL — Material properties under extreme pressure (>1 Mbar) are of great interest to the material science community as well as the astro-planetary sciences. We are developing an experimental technique that can compress materials quasi-isentropically at very high pressures and ultrahigh strain rates using high power lasers such as the Omega laser system at Rochester, NY and eventually on NIF at Livermore, CA. Omega lasers can reach up to 2 Mbar and we expect to achieve >10 Mbar with NIF [H. S. Park et al., JPCS, **112**, 042024 (2008)]. We have studied the material properties by measuring the growth factors on the artificially induced sinusoidal target samples via Rayleigh-Taylor hydrodynamic instabilities. We utilize face-on radiography taken with the laser-driven x-ray backlighters. This paper will present our recent work on vanadium especially focusing on the grain boundary effects on the growth rate. Our results will be compared to the crystal plasticity model and the various material strength models.

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