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Structural Changes Due to Shock Compression of Ce-Al Melt-Spun Ribbons ALEX W. BRYANT, Georgia Institute of Technology, CHRISTOPHER WEHRENBERG, Lawrence Livermore National Laboratory, JONATHAN D. POPLAWSKY, KARREN L. MORE, Oak Ridge National Laboratory, FAISAL ALAMGIR, Georgia Institute of Technology, BRUCE REMINGTON, Lawrence Livermore National Laboratory, NARESH N. THADHANI, Georgia Institute of Technology — Shock compression experiments were performed on Ce-Al melt-spun ribbons. The shock-induced changes were characterized using XRD, TEM, and APT. The experiments allow for the determination of the effects of shock compression on the microstructure of the amorphous and nanocrystalline structures inherent in melt-spun ribbons. Samples of $\sim$ 1 mm x 2 mm width and $\sim$ 40 μm thickness were prepared as multi-layered stacks with $\sim$ 6 μm thick epoxy layers and subjected to laser shock loading at the Laboratory for Laser Energetics in collaboration with Lawrence Livermore National Laboratory. The layered organization allowed for multiple shocked states to be characterized from 50J and 30J laser energies due to attenuation between each layer. Synchrotron XRD analysis performed at Brookhaven National Laboratory indicate increases in grain size for the top layers of the 30J and 50J impacts and complete attenuation of this observable effect by about the 5^{th} layer. TEM and APT analyses performed on a portion of the top 5 layers of the stacks at the Center for Nanophase Materials Sciences in Oak Ridge National Laboratory indicate the presence of nanocrystalline grains ($<$) 10nm in the as-received melt-spun ribbons, and defect structures including twinning and banded regions in the shocked ribbons.

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