Abstract Submitted
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**Fabrication and Characterization of Thermite Reactive Nano-Laminates**[1] EVYN LEE, JON-PAUL MARIA, NC State University, SERGEY MATVEEV, DANA DLOTT, University of Illinois at Urbana-Champaign , CHRISTINA ROST, PATRICK HOPKINS, University of Virginia — Results of fabrication and characterization of thermite reactive nano-laminates (RNLs) via magnetron sputtering will be presented. The samples were created in a bilayer geometry of a metal and metal oxide at varied thicknesses to alter the amount of interfacial area readily available to participate in the reaction. Two systems were investigated to characterize the RNL system: Al/CuO and Zr/CuO. The Al/CuO system was fabricated at a constant overall stack thickness of nearly one micron with varied numbers of bilayers (one to seven). Thermal conductivity and interface conductance of the Al/CuO system were investigated via time-domain thermoreflectance (TDTR). The Zr/CuO system was also fabricated at varying bilayer thickness and was characterized via high throughput shock studies to characterize the oxygen transfer process at short time scales. Emissions were obtained via a flyer plate impact at velocities ranging 0.5- 2 km $s^{-1}$ at durations of 4-16 ns. The reaction impact threshold was found to be at velocities lower than 0.7(+/-0.05) km $s^{-1}$. At impact velocities above the threshold, the reaction onset is seen at approximately 1 $\mu$s.

[1]ARO MURI: Multimodal energy flow at atomically engineered interfaces

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