

Abstract Submitted
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Nano-Scale Energetic Films by Superfluid Helium Droplet Assembly SAMUEL EMERY, Air Force Research Laboratory, JASON BOYLE, Naval Surface Warfare Center Indian Head Division, KEITH RIDER, Longwood University, BRIAN LITTLE, C. MICHAEL LINDSAY, AMANDA SCHRAND, Air Force Research Laboratory — We have recently transitioned superfluid helium droplet assembly of clusters into a deposition tool that is capable of creating nano-structured films of composite metal-based energetic materials (EM). Such materials are ideal candidates to study propagation of reactions at small scale, and could be alternatives to organic based EM due to their higher energy densities. The helium droplet methodology may also provide a solution overcoming issues of reaction-limiting effects such as the formation of oxide layers by exploiting ‘magic-number’ cluster sizes and core-shell cluster mechanisms. This presentation will describe the following: foundational work to model and characterize the deposition of magnesium clusters by superfluid helium droplet assembly, our efforts to produce magnesium-Fomblin core-shell EM cluster-based films on a surface, and our early attempts at making intermetallic cluster-based films.

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