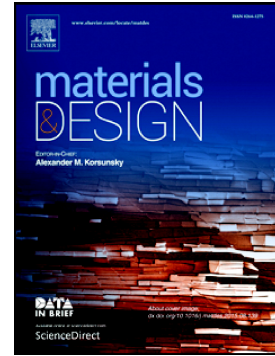


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## Morphological and Combustion Study of Interface Effects in Aluminum-Poly(vinylidene fluoride) Composites

Jena McCollum<sup>a†</sup>, Aimee M. Morey<sup>b</sup>, Scott T. Iacono<sup>b</sup>

<sup>a</sup>Department of Mechanical and Aerospace Engineering

University of Colorado Colorado Springs

1420 Austin Bluffs Pkwy,

Colorado Springs, Colorado, 80918

<sup>b</sup>Department of Chemistry & Chemistry Research Center

United States Air Force Academy

2354 Fairchild Drive,

Colorado Springs, Colorado, 80840

<sup>†</sup>Corresponding author: [jmccollu@uccs.edu](mailto:jmccollu@uccs.edu)

Condensed energetic composites were produced from poly(vinylidene fluoride) (PVDF) and nano-scale aluminum (Al) via injection molding. This work aimed to (1) resolve changes in PVDF decomposition as a function of composition approaching Al concentrations sufficient in producing self-propagating burns and (2) observe interface effects on combustion performance. Dynamic mechanical analysis showed that the PVDF glass transition response to Al loading was negligible indicating that Al particles were well dispersed in the composite. This finding was confirmed with scanning electron microscopy imaging. Combustion performance was assessed with open-air burns and X-ray diffraction. Coupons loaded beyond 4 wt % Al burned in a linear manner and primarily produced aluminum fluoride (AlF<sub>3</sub>). Overall, results show that a condensed interface in Al-PVDF composites enhances ignition sensitivity at low Al loadings and controls reaction product species.

**Keywords:** Energetic materials, Injection molding, Aluminum, PVDF, Thermal analysis,

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