Abstract Submitted
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Simulation of Particle Size Effect on Dynamic Properties and Fracture of PTFE-W-Al Composites[1] ERIC HERBOLD, Dept. of Mechanical and Aerospace Engineering, University of California, San Diego, La Jolla, CA 92093-0411, JING CAI, Materials Science and Engineering Program, University of California, San Diego, La Jolla, CA 92093-0418, DAVID BENSON, VITALI NESTERENKO, Dept. of Mechanical and Aerospace Engineering, University of California, San Diego, La Jolla, CA 92093-0411 — Recent investigations of the dynamic compressive strength of cold isostatically pressed (CIP) composites of polytetrafluoroethylene (PTFE), tungsten and aluminum powders show significant differences depending on the size of metallic particles. PTFE and aluminum mixtures are known to be energetic under dynamic and thermal loading. The addition of tungsten increases density and overall strength of the sample. Multi-material Eulerian and arbitrary Lagrangian-Eulerian methods were used for the investigation due to the complexity of the microstructure, relatively large deformations and the ability to handle the formation of free surfaces in a natural manner. The calculations indicate that the observed dependence of sample strength on particle size is due to the formation of force chains under dynamic loading in samples with small particle sizes even at larger porosity in comparison with samples with large grain size and larger density.

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