

Abstract Submitted
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Mechanical and Microstructural Properties of PTFE/Al/W Composite¹ JING CAI, FENGCHUN JIANG, KENNETH VECCHIO, MARC MEYERS, VITALI NESTERENKO, University of California, San Diego — Mechanical and microstructural properties of PTFE/Al/W composites with a density up to 7.1 g/cc fabricated by cold isostatic pressing with identical weight ratios of constituents (PTFE serving as the matrix) were investigated using quasi-static and Hopkinson Bar compression tests. The ultimate compressive strengths of the PTFE/Al/W composite (7.1 g/cc) with coarse W particles was ~18 MPa (quasi-static loading) and ~24 MPa (dynamic loading), while more porous PTFE/Al/W composite with fine W particles (5.9 g/cc) had flow stress 24 MPa (quasi-static) and 44 MPa (dynamic). Critical strains to failure for both composites are 4-5%. We attribute this unusual behavior to force chains created by small tungsten particles. Environmental scanning electron microscope revealed that the PTFE matrix was populated by a homogeneous distribution of nano-cracks and nanofibers of PTFE were observed after dropweight tests.

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