

Abstract Submitted
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Dynamic-tensile-extrusion response of fluoropolymers ERIC N. BROWN, GEORGE T. GRAY III, CARL P. TRUJILLO, Los Alamos National Laboratory — The quasistatic and dynamic response of two fluoropolymers—polytetrafluoroethylene (PTFE) and polychlorotrifluoroethylene (PCTFE)—have been extensively characterized. The two polymers exhibit significantly different failure behavior under tensile loading at moderate strain rates. Polytetrafluoroethylene resists formation of a neck and exhibits significant strain hardening. Independent of temperature or strain rate, PTFE sustains true strains to failure of approximately 1.5. Polychlorotrifluoroethylene, on the other hand, consistently necks at true strains of approximately 0.05. Here we investigate the influence of this propensity to neck or not between PCTFE and PTFE on their response under Dynamic-Tensile-Extrusion. Similar to the Taylor Impact Rod, Dynamic-Tensile-Extrusion is a strongly integrated test, probing a wide range of strain rates and stress states. The results of the Dynamic-Tensile-Extrusion technique are compared with two classic techniques. Both polymers have been investigated using Tensile Split Hopkinson Pressure Bar.

Eric N. Brown
Los Alamos National Laboratory

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