

Abstract Submitted
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Constitutive Modeling of the Dynamic-Tensile-Extrusion Test of PTFE ANATOLY RESNYANSKY, Weapons and Combat Systems Division, DSTO, PO Box 1500, Edinburgh SA 5111, Australia, ERIC BROWN, P-23, Los Alamos National Laboratory, Los Alamos, NM 87545, USA, CARL TRUJILLO, GEORGE GRAY, MST-8, Los Alamos National Laboratory, Los Alamos, NM 87545, USA — Use of polymers in the defence, aerospace and industrial application at extreme conditions makes prediction of behaviour of these materials very important. Crucial to this is knowledge of the physical damage response in association with the phase transformations during the loading and the ability to predict this via multi-phase simulation taking the thermodynamical non-equilibrium and strain rate sensitivity into account. The current work analyses Dynamic-Tensile-Extrusion (DTE) experiments on polytetrafluoroethylene (PTFE). In particular, the phase transition during the loading with subsequent tension are analysed using a two-phase rate sensitive material model implemented in the CTH hydrocode and the calculations are compared with experimental high-speed photography. The damage patterns and their link with the change of loading modes are analysed numerically and are correlated to the test observations.

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