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Shock, release and reshock of PBX 9502: experiments and modeling TARIQ ASLAM, RICHARD GUSTAVSEN, Los Alamos National Laboratory, NICHOLAS WHITWORH, AWE Aldermaston, RALPH MENIKOFF, Los Alamos National Laboratory, CRAIG TARVER, Lawrence Livermore National Laboratory, CAROLINE HANDLEY, AWE Aldermaston, BRIAN BARTRAM, Los Alamos National Laboratory — We examine shock, release and reshock into the tri-amino-tri-nitro-benzene (TATB) based explosive PBX 9502 (95% TATB, 5% Kel-F 800) from both an experimental and modeling point of view. The experiments are performed on the 2-stage light gas gun at Los Alamos National Laboratory and are composed of a multi-layered impactor impinging on PBX 9502 backed by a polymethylmethacrylate window. The objective is to initially shock the PBX 9502 in the 7 GPa range (too weak to start significant reaction), then allow a rarefaction fan to release the material to a lower pressure/temperature state. Following this release, a strong second shock will recompress the PBX. If the rarefaction fan releases the PBX to a very low pressure, the ensuing second shock can increase the entropy and temperature substantially more than in previous double-shock experiments without an intermediate release. Predictions from a variety of reactive burn models (AWSD, CREST, Ignition and Growth, SURF) demonstrate significantly different behaviors and thus the experiments are an excellent validation test of the models, and may suggest improvements for subsequent modeling efforts.

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