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Double Shock Experiments and Reactive Flow Modeling on LX-17 to Understand the Reacted Equation of State KEVIN S. VANDERSALL, FRANK GARCIA, LAURENCE E. FRIED, CRAIG M. TARVER, Lawrence Livermore National Laboratory — Experimental data from measurements of the reacted state of an energetic material are desired to incorporate reacted states in modeling by computer codes. In a case such as LX-17 (92.5% TATB and 7.5% Kel-F by weight), where the time dependent kinetics of reaction is still not fully understood and the reacted state may evolve over time, this information becomes even more vital. Experiments were performed to measure the reacted state of LX-17 using a double shock method involving the use of two flyer materials (with known properties) mounted on the projectile that send an initial shock through the material close to or above the Chapman-Jouguet (CJ) state followed by a second shock at a higher magnitude into the detonated material. By measuring the parameters of the first and second shock waves, information on the reacted state can be obtained. The LX-17 detonation reaction zone profiles plus the arrival times and amplitudes of reflected shocks in LX-17 detonation reaction products were measured using Photonic Doppler Velocimetry (PDV) probes and an aluminum foil coated LiF window. A discussion of this work will include the experimental parameters, velocimetry profiles, data interpretation, reactive CHEETAH and Ignition and Growth modeling, as well as possible future experiments. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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