

Abstract Submitted  
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**Relationship between Pressure and Reaction Violence in Thermal Explosions** LAURA SMILOWITZ, BRYAN HENSON, GEORGE RODRIGUEZ, DENNIS REMELIUS, EVA BACA, DAVID OSCHWALD, NATALYA SUVOROVA, Los Alamos National Laboratory — Reaction violence of a thermal explosion is determined by the energy release rate of the explosive and the coupling of that energy to the case and surroundings. For the HMX and TATB based secondary high explosives studied, we have observed that temperature controls the time to explosion and pressure controls the final energy release rate subsequent to ignition. Pressure measurements in the thermal explosion regime have been notoriously difficult to make due to the extreme rise in temperature which is also occurring during a thermal explosion. We have utilized several different pressure measurement techniques for several different secondary high explosives. These techniques include commercially available piezoelectric and piezoresistive sensors which we have utilized in the low pressure (sub 30 MPa) range of PBX9502 thermal explosions, and fiber bragg grating sensors for the higher pressure range (up to GPa) for PBX9501 experiments. In this talk, we will compare the measurement techniques and discuss the pressures measured for the different formulations studied. Simultaneous x-ray radiography measurements of burn velocity will also be shown and correlations between pressure, burn velocity, and reaction violence will be discussed.

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