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Spectroscopy in Deflagrating High Explosives SUZANNE SHEEHE, SCOTT JACKSON, Los Alamos National Laboratory — Physically based kinetic models are desirable to enhance the predictive capability of reaction zone (RZ) models for high explosives (HEs). Current models use only a 1- or 2-step reaction mechanism, which may not fully capture all relevant kinetic effects on deflagrative and detonative performance. The development of more physically accurate multi-step reaction models (containing both endothermic and exothermic steps) for HEs could dramatically improve the predictive range of models. Despite significant efforts to spectroscopically characterize detonating HE flows, progress has been limited due to the extremely temporally (20 ns) and spatially (200 micron) short detonation RZ scales, and high optical opacity. Deflagrations have significantly larger reaction zone scales (mm-sized), pressure-dependent burn rates (on the order of mm/s) and lower opacity at pressures in the MPa range. This readily enables spectroscopic characterization of key transient species critical in late-stage energy release. This work presents and discusses new results of emission spectroscopy and burn rate measurements in deflagrating HE (such as PBX 9407 and PBX 9502).

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