Abstract Submitted
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Study of molecular carbon-hydrogen bond dissociation during shock compression[1] BEN HAMMEL, JAMES HAWRELIAK, Washington State University — Advancements in theory and experiment show that chemical interactions in warm dense mixtures play a non-negligible role in the high-temperature and high-pressure properties of a molecular compound. For example, recent work on polystyrene has observed features suggestive of molecular dissociation - non-linear "kinks" are evident in the material's Hugoniot [Barrios et al.], consistent with CH bond breaking. The assumption used in linear mixing models, that species are chemically inert, breaks down in warm dense mixtures. At the Institute for Shock Physics, we are developing the necessary capabilities to perform high-repetition-rate experiments needed to map out chemical-reaction features along a material's Hugoniot. Initially, we plan to benchmark our work to the data taken by Barrios et al., by reproducing the observed kink in the polystyrene Hugoniot. We then extend this capability to explore polypropylene, CH_2, where we expect to observe multiple kink features - representative of the disassociation of multiple CH bonds.

M. Barrios et al. Phys. Plasmas 17, 056307 (2010)

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