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Using Measured Hot Spot Temperatures in the Statistical Hot Spot Model CRAIG TARVER, Lawrence Livermore Natl Lab — The missing link for developing realistic Arrhenius temperature dependent reaction rate laws for shock initiation and detonation reactive flow modeling was time resolved experimental measurements of unreacted hot spot, reacted hot spot, growing hot spot, and fully reacted reaction product temperatures. Recent measurements of such temperatures in several explosives by Bassett and Dlott have provided this data. This paper estimates the unreacted bulk shock, unreacted hot spot, reacted hot spot, and final reaction product temperatures for HMX and TATB as functions of shock strength. These temperatures are used to estimate Arrhenius reaction rates using actual activation energy barriers during shock to detonation transition. Such reaction rates will form the bases for macroscopic reaction rate schemes in the Statistical Hot Spot model. This work was performed under the auspices of the United States Department of Energy by the Lawrence Livermore National Laboratory under Contact DE-AC52-07NA27344.

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