

Abstract Submitted
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Numerical Study of Mechanism of Hot Spot Formation in Heterogeneous HE. VLADIMIR KLIMENKO, High Pressure Center, Institute of Chemical Physics, Russia — To prepare a precise numerical model of detonation it is necessary to use perfect physics for description of multiple detonation process. Hot spot mechanism is used (in different numerical realizations) in all current numerical detonation models. All previous investigations of this process were concerned to pressure region 10-30 kbar. But, real calculations deal with more wide range 10-500 kbar. We have studied physics of hot spot formation process at pressures 30-150 kbar. Detailed study was made by 2D hydrocode with including a viscous heating as key mechanism of energy dissipation in hot spot process. We considered real case, namely, ignition of pores in PBX-9501 with specific distribution in size. Process of hot spot formation has three stages: (1) quasi-thermal explosion, (2) transition stage and (3) stage of steady burning. Only the first stage is realized for small pores at low pressures. This gives dramatic change in burning topology of real HE compositions when pressure crosses transition region 60-80 bar. Obtained results on hot spot mechanism have permitted to improve greatly physical level of numerical model of detonation.

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