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Numerical Model of Detonation for Insensitive HE VLADIMIR KLIMENKO, Institute of Chemical Physics, Moscow — Most of modern munitions are filled by insensitive HE. However, mechanism of initiation of these HE is still unknown. IHE have not any pores and, therefore, hot spot mechanism does not work here. What is a mechanism working in this case? We have used 3D hydrocode to study process of shock wave loading of mixture of HMX grains with different binders (HMX/binder=88/12) and have determined formation of surface layers with increased plastic deformation. According to the dislocation mechanism of detonation (V. Klimenko, I. Kozyreva, J. Energetic Materials, 2010, v. 28, pp. 249-262) plastic deformation generates definite concentration of radicals. Surface layers have also increased temperature due to viscous work. So, these activated layers have increased temperature and number of radicals in comparison with values inside grains. Kinetic calculation has shown fast decomposition of these layers. As a result, the activated layer is ignited and this gives beginning of grain burning process. The developed two-stages mechanism has been incorporated into 2D hydrocode. The developed numerical model demonstrates high accuracy in simulation of detonation processes in IHE (in particular, PBXN-110 and B2241).

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