Numerical study on thermal decomposition and cook-off behavior of confined high energetic material

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Research has been conducted to investigate the thermal stability TNT and their response to thermal stimuli. In this work, numerical CFD simulation will be executed for the thermal behavior of TNT including cook-off and thermal decomposition. The heating rates were varied for both slow and fast cook-off. In view of this thermal decomposition reactions which mainly consists of kinetic parameters was factored in the numerical simulation as well as the critical thermodynamic physical properties. Attention and consideration was paid to the melting time to ignition of explosive, the location likely for ignition occurrence as well as temperature distribution in the course of the heating process. The simulation was executed by using CFD software where the results showed that the melting to ignition time decreased and the shell temperature increased with increasing heat flux. The results also indicated that the location of ignition was around the fuze.
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