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Numerical exploration on the ignition mechanism of solid composite explosives in drop hammer test[1] ZHI-YUE LIU — Solid composite explosives are very popular forms of explosives for application at present. The sensitivity study on those explosives is of great importance for the safety and security either in usage or in storage. One conventional technique on the sensitivity is drop hammer test in which the explosive samples are subjected to the falling hammer impact to examine the occurrence of explosion. The falling height of the drop hammer from which the ignition is able to be incurred is usually taken for the characterization of impact sensitivity of those explosives. Friction and trapped-gas compression have been postulated as the two main mechanisms to cause the ignition of explosives. In the paper, a numerical approach is established to quantitatively verify the roles of such two factors in the process of ignition. In the analysis the composite explosive is assumed to be composed of the pile-up of circular particulate explosive crystals. The heat formation due to friction and trapped-gas compression is calculated. Combined with the ensuing heat conduction into crystal particulate, the whole decomposition process of the explosive particulate is analyzed to examine the possible ignition of the explosive samples.

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