A MULTI-PHASE REACTIVE FLOW MODEL FOR ALUMINIZED EXPLOSIVES

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Traditional explosive compositions, such as Pentolite or C4, are often classified as *ideal*, meaning that the energetic material reacts entirely in the detonation wave and the propagation of detonation waves prescribes to the Chapman-Jouget (C-J) theory. Modern explosive compositions, on the other hand, often contain materials designed to alter the characteristics of the reaction resulting in behavior distinct from ideal (such as enhanced blast), and are called *non-ideal*. Aluminum, for example, is often added to traditional explosive compositions for this purpose. There have been many attempts to develop reactive flow models for aluminized explosives. The simplest among these is probably the model proposed by Miller and Gurguis [1], who incorporated a time-dependent modification to the JWL equation of state to account for the delayed reaction of aluminum. More complex models, such as those proposed by Kuhl and Bell [2] and Togashi et.al [3], attempt to consider more details of the reactive chemistry and have been somewhat successful in replicating certain aspects of non-ideal behavior. In our approach a balance is struck between simplicity and the need to represent important physical phenomenon in the reaction; for example, the energetic organics and aluminum are treated as single phases so that the evolution of individual chemical species is not considered. Simple mixture rules are applied to yield a single pressure for a given the density, energy and extent of reaction from the two phases. Results from the model are shown for PBXN-111.

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