ABSTRACTS AND INFORMATIONS

I C D E R S

13th International Colloquium on Dynamics of Explosions and Reactive Systems

July 28 ~ August 2, 1991

Nagoya International Center, Nagoya, Japan

A STEADY ONE-DIMENSIONAL MODEL OF THERMAL DETONATION IN MOLTEN Sn - WATER SUSPENSION

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Abstract

A violent large-scale interaction between molten tin and water is considered within the framework of a steady thermal detonation model. A modified fragmentation mechanism based on experimental data is introduced into the model. This mechanism incorporates some time delay between lead shock arrival and the incipience of drop breakup in the liquid-liquid systems.

Equations governing a separated one-dimensional two-phase flow are studied qualitatively and solved numerically. It is found that momentum losses due to friction at the tube walls reduce the detonation velocity and maximum overpressure in the system. It is also shown that within a certain range of wall surface roughness no steady thermal detonation exists.The influence of the initial vapor content on the detonation parameters is analyzed.

A special analysis is undertaken to determine singularity conditions at the C-J plane. In contrast to the ideal case a certain difference in the phase velocities should exist when the chocking condition is attained. This phenomenon is analogous to incomplete fuel burnout in the reaction zone of non-ideal chemical detonations.