SHOCK PROPAGATION THROUGH PARTICLE-LADEN CLOUDS – AN UPDATE ON THE CURRENT STATUS IN THE EXPERIMENTAL AND NUMERICAL WORK

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This paper presents work in progress on shock propagation through particle-laden gas clouds. A laboratory facility developed in Horten, Norway, has been constructed with a shock tube, sensor gauges and a specially designed window section to allow two directional high speed video filming, The experimental setup has been used to study shock interaction with clouds of particles injected prior to shock passage. The particles are injected from the bottom of the tube using a spark igniter. The in-house numerical code Regularized Smoothed Particle Hydrodynamics (RSPH) has recently been extended to allow multi-phase simulations. Numerical simulations are preformed with both the RSPH and a multi-phase finite volume Eulerian-Lagrangian method. The experimental tests so far have been performed with inert particles.
The number of published data on shock ignition of aluminum particles in a shock tube is unfortunately rather sparse and the documentation incomplete. The published data also indicate scattering in the results observed. The goal of the current work has therefore been to investigate the possibilities of constructing an experimental facility to allow fundamental studies of ignition of aluminum particles. A specially designed shock tube will be set up early 2018, and preliminary results from this experimental work will be presented and compared to results from numerical simulations.