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Small and Large-Scale Mixing Measurements in a Shock-Driven Multiphase Instability.[1] VASCO DUKE, WILLIAM MAXON, ROY ALLEN, JACOB MCFARLAND, None — New experimental techniques and methodologies are applied for the investigation of the physical phenomena induced by the impulsive acceleration of a heterogeneous multiphase flow-field within a shock tube system. New equipment was designed to create and a cylindrical interface comprising of nitrogen gas, seeded with micron-sized acetone droplets, generated within the shock tube's test section. The nitrogen gas itself was saturated with acetone vapor tracer and mixed into the interface to prevent premature droplet evaporation. The interface is then impulsively accelerated by a planar shock wave. The development of both the dispersed and carrier phases was captured through a series of Planar Laser Mie Scattering and Planar Laser-Induced Fluorescence images, respectively. Results of these experiments were compared against evaporation measurements with models like the D-Square-Law and simulations. This experimental investigation has a multitude of applications in a variety of scientific and engineering systems; with relevance to systems that involve high-speed or shock-induced multiphase combustion.

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None

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