

Ignition delay study of aluminum oxide liquid nano-fuel in shock tube

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Abstract: Ignition delay time of aluminum oxide (Al_2O_3) liquid nano-fuel was compared with that of base-fuel to study the feasibility of its use for high-speed aerospace applications. The base-fuel was Aviation Turbine Fuel (ATF) that was mixed with Al_2O_3 nanoparticles, to coin a nano-fuel, which could be used for regenerative cooling of the combustor walls before injection. The experiments were carried out in a shock tube. The fuel was introduced into the shock tube in the form of a wall droplet. The ignition delay time of the nano-fuel was observed to increase slightly, by about 11% (maximum) in comparison with the base-line, at an equivalence ratio of unity.

Keywords: Liquid- nano-fuel, Ignition delay, High-speed, Al_2O_3 .