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Fundamental Chemical Kinetic Experiments of Combustion Products inside a Shock Tube

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FUNDAMENTAL CHEMICAL KINETIC EXPERIMENTS OF COMBUSTION PRODUCTS INSIDE A SHOCK TUBE

by

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ABSTRACT

The use of lateral divert thrusters on hypersonic vehicles would allow for fine-tuned attitude control at high Mach numbers. However, the jet interaction effects of lateral thrusters on the hypersonic flow field have not been investigated thoroughly. Computational Fluid Dynamics (CFD) can provide preliminary modeling of the jet interaction, but several variables such as vehicle geometry, velocity, and altitude, result in computationally expensive modeling or loss in accuracy of the results. Therefore, the goal of chemical kinetics testing and chemical model verification is to enhance the fidelity of the jet interaction effects, specifically the plume reaction with air and the plume interaction with vehicle instrumentation.

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