

Experimental Study of Ammonia Ignition

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Ammonia has been considered as a potential clean alternative energy carrier for automobile engines and gas turbines because of its production from renewable sources using concepts such as power-to-gas. It is regarded to be a carbon free fuel and burns in an environmentally benign way, producing no soot. However, knowledge of NO_x and other pollutant formation in engines at high compression ratios is lacking. A detailed understanding of combustion characteristics of ammonia over a wide range of conditions is required for fuel-engine optimization and for its use in conventional and advanced engines.

The present study focusses on ignition delay time measurements of ammonia/air mixtures in a high pressure shock tube and in a rapid compression machine facility. Experiments were carried out over the temperature range of 1000 - 1500 K, pressures of 20 and 40 atm, and equivalence ratios of 0.5, 1.0 and 2.0. The experimental results are used for detailed kinetic model development and validation.