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STUDY ON THERMOACOUSTIC OSCILLATION CHARACTERISTICS OF CARBON NANOTUBES

Abstract

In order to study the nonlinear dynamic combustion response characteristic of solid propellant under the limit amplitude of oscillation, a stable and controllable acoustic source is needed to produce large amplitude of pressure oscillation in the combustor. Based on the principle of thermoacoustics, this paper explores a method of producing large amplitude of pressure oscillations in a tube-like combustor using carbon nanotubes. Using the low-order thermoacoustic network model, the thermoacoustic oscillation characteristics of a tubular combustor closed at both ends at different heat source positions (0.125m/0.25m/0.625m), heat release power (239W 765W), and mean pressure (10.1325kPa 300kPa) were studied. Results show that carbon nanotubes can work continuously and stably as a heat source, and produce a certain amplitude of pressure oscillation in the combustor; different heat source positions and heat release power have a great impact on the amplitude of pressure oscillations; Under the conditions of heat source position x=0.125m, maximum heat release power (765W), and mean pressure of 100kPa, the maximum pressure oscillation amplitude can reach 20.67