

Thermal Decomposition Characteristics of LS-Based Propellant

HU Song-qi, CHEN Jing, WU Su-li, DENG Zhe

(National Key Laboratory of Combustion, Flow and Thermo-structure, Northwestern Polytechnical University, Xi'an 710072, China)

Abstract: Thermal stabilities of lead styphnate (LS) / nitrocellulose (NC) / dibasic lead stearate (SQ-2) were studied by Different Scanning Calorimetry (DSC) and Thermogravimetry (TG). The energetic properties of four propellants (ammonium perchlorate (AP) / hydroxy-terminated polybutadiene (HTPB), AP/NC, LS/NC and LS/SQ-2) were analyzed with thermodynamic calculation method. Thermal decomposition characteristics of three LS/NC propellants with ratio of LS to NC as 5 : 5, 6 : 4 and 7 : 3 and four LS/SQ-2 propellants with ratio of LS to SQ-2 as 4 : 6, 5 : 5, 6 : 4 and 7 : 3 were researched. Results show that the thermo-stability of LS decreases by adding NC or SQ-2, and its energy enhances, in which the effect of NC is more obvious, considering that LS and NC can be chosen as the components of propellant used in micro solid rocket motor.

Key words: aerospace propulsion theory and engineering; thermodynamic calculation; LS/NC propellant; thermal decomposition characteristic; energy property

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