

Dynamic combustion characteristics of electrically controlled solid propellant with transient voltage

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ABSTRACT: Electrically controlled solid propellant (ECSP) is a novel propellant can implement on-off as well as burning rate transactive control with electrical signal, extending infinite possibilities to controllable propulsion technology. Considering the practical application of controllable propellants, the multi-stage transient voltage (100 V to 150 V, 150 V to 200 V, 100 V to 200 V) combustion characteristics of ECSP are investigated in this work, utilizing the laboratory-built atmospheric pressure electrically controlled combustion test system. The results indicated that the combustion of ECSP had obvious unstable transition phenomenon with the transient of voltage, especially in the high-wide voltage conversion stage. Additionally, the inflection point of the dynamic burning rate curve for ECSP was sharp at the voltage transient point, revealing low conversion time.

