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A Simulation Study of the Combustion Mechanism of Aluminum in Solid Rocket Propellant at High Temperatures and Pressures in a Shock Tube

Authors: [Zichao Liu](#); [FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH](#)

Abstract: The study of aluminum combustion in pure oxygen and mixture (N2-H2- Cl2-O2) at high temperatures and pressures provides a simulation of combustion mechanism study of aluminum powder in solid rocket propellant. Computations were performed for predicting possible intermediate species and products. Emission spectra of important intermediate species were identified by using a spectrometer. Time histories of the AIO emission band show the continuum radiation of Al2O2 in the reaction scheme. The solid and liquid products were observed and analyzed by electron diffraction, X ray diffraction, transmission and scanning electron microscopes. The gaseous products were detected by using infrared spectrometry. These measurements are in good agreement with the computations and provide useful chemical kinetic data. Keywords: Mathematical prediction, Aluminized propellants, Aluminum oxides. (Chinese translations). ANNOTATION: A Simulation Study of the Combustion Mechanism of Aluminum in Solid Rocket Propellant at High Temperatures and Pressures in a Shock Tube-- Translation.

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