

Design and Development of Hybrid Rocket Motor

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Abstract : This project focuses on the design and development of a lab-scale hybrid rocket motor to accurately determine the regression rate of a fuel/oxidizer combination consisting of solid paraffin and gaseous oxygen (GOX). Hybrid motors offer the advantage of on-demand thrust control over both solid and liquid systems in certain applications. The thermodynamic properties of the propellant combination were calculated using NASA CEA at different chamber pressures and corresponding O/F values to determine initial operating conditions with suitable peak temperatures and optimal O/F values. The project also includes the design of the injector orifice and the determination of the final design configurations of the motor casing, pressure control setup, and valve configuration. This research will be valuable in advancing the understanding of paraffin-based propulsion and improving the performance of hybrid rocket motors.

Keywords : hybrid rocket, NASA CEA, injector, thrust control

Conference Title : ICAAAE 2024 : International Conference on Aeronautical and Aerospace Engineering

Conference Location : Mumbai, India

Conference Dates : February 12-13, 2024