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Investigation of Beeswax Regression Rate Doped with Metallic Additives Concentration
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Abstract
This study investigates the viability of beeswax as sustainable solid propellant for hybrid rocket motors due to the increasing concerns about the pollution together with the sustainability of the fuel used in the rocket industry. Hybrid rocket motors are gaining attention due to its design simplicity and reliability, but it has a major drawback which is the low regression rate of the fuel. In order to increase the regression rate of beeswax as solid propellant, metallic additives are added as it contains high energy density. Static firing is done to investigate the regression rate of beeswax doped with different metallic additives such as Aluminum and Ferum. The concentrations of the metallic additives added are varied by 1% and 5% to investigate its effect on the regression rate. The investigation finds that beeswax doped with Aluminum gives a higher regression rate increment compared to Ferum. The highest increment goes up to 81.43% when beeswax is doped with 5% of Aluminum compared to pure beeswax. This paper also provides other mitigations that can be done to increase the regression rate of solid propellent further.

Author Keywords
Aluminum; Beeswax; Biomass Fuel; Hybrid Rocket Motor; Iron; Metallic Additives; Regression Rate

Index Keywords
Fuel additives, Solid propellants; Additive concentrations, Beeswax, Biomass fuels, Higher energy density, Hybrid rocket motors, Metallic additives, Regression rate, Rocket industry, Static firing; Rocket engines

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