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(57) Abstract :

ABSTRACT SYSTEM AND METHOD TO CALIBRATE COMBUSTION TIME FOR SOLID PROPELLANT GRAINS A solid propellant is simple and reliable rocket fuel. Once ignited, the propellant cannot be stopped since they burn until they run out. Solid fuel rockets are widely used in military applications such as missiles because they can be stored for long periods of time without degrading the propellant. The primary objective of this research is to study the burnout mass of solid propellants using various propellants and catalysts. Potassium Nitrate (KNO₃) was chosen as an oxidant in the experiment because of its compatibility with other ingredients and low-cost affordability. KNO₃ was used as an oxidizer in 65% ratio with 34% of the fuel and 1% of the catalyst. KNO₃, fuel ingredients like Fructose, Glucose and Lactose with catalysts Copper and Aluminium were taken in powdered form. Cylindrical stainless steel with one closed end was taken to fill the cavity, and a concentric hole was made for constant burning. This propellant-filled chamber was attached to a C Clamp so that it does not propel during fuel combustion when thrust is formed. The obtained result shows that the longest burnout mass was secured by burning Glucose with Copper powder and KNO₃ for 136 s when compared to the shortest burnout mass was secured by burning Lactose with Aluminium powder and KNO₃ mixture to 57 s. The highest temperature of the mixture was Lactose with Copper powder and KNO₃ resulted in 518 °C when compared to the lowest temperature of the mixture was Glucose with Copper powder and KNO₃ was 211.75 °C.

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