

SPACE PROPULSION SYMPOSIUM (C4)  
Interactive Presentations (IP)

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STUDY ON AUTO-IGNITED HYBRID ROCKET BASED ON N<sub>2</sub>O OXIDIZER USING CATALYTIC  
IGNITION SYSTEM**Abstract**

Auto-ignition of a hybrid rocket based on N<sub>2</sub>O oxidizer using catalytic ignition system was studied. The catalytic ignition mechanism is a technique that induces spontaneous ignition through the high-temperature gas caused by catalytic decomposition. The catalytic ignition system consists of two main part; one is a pre-heating assembly and the other is a catalytic ignitor. The advanced design of the heat-exchange between the N<sub>2</sub>O oxidizer and the catalyst was applied to improve the capability of the catalytic decomposition for the high supply rate of N<sub>2</sub>O oxidizer. The N<sub>2</sub>O oxidizer that is supplied at the temperature lower than -20°C was fully heated higher than 100°C through the pre-heating assembly. The N<sub>2</sub>O oxidizer was decomposed rapidly because the pre-heated N<sub>2</sub>O was injected to the catalytic ignitor. A single port solid propellant grain was installed at the end of the catalytic ignitor to evaluate the feasibility of the auto-ignition through the high-temperature gas generated by the catalytic ignitor system. Two types of the solid propellant, PE and PMMA, were tested, resulting in the successful hot-firing using the catalytic ignitor.