

Catalyst-Infused Fuel for Ignition Assist of a Hydrogen Peroxide Hybrid Thruster

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Abstract

Hybrid rocket engines utilize a combination of fluid oxidizer (high density-impulse) and solid fuel to create a propulsion system for small satellites. These systems utilize a catalyst to aid in latency of the satellite, which is incorporated in a variety of ways. This technology proposes a more effective inclusion of the catalyst both in terms of decreasing latency and also safety factors.

Problem

Existing hybrid rocket engine propulsion systems often have bulky and complicated mechanics, with safety concerns and increased latency of small satellites.

Solution

The inventive infusion process of incorporating a catalyst into solid fuel removes the need for any extra mechanics to improve performance of satellites.

Value Proposition

Facilitates ease in manufacturing, decreases latency of spacecraft, is safer in operation (lower risk of over-pressurization), and is generally safer and more effective than traditional infusion processes.

Benefit

The inventive process of incorporating the catalyst into the solid fuel removes the need for any extra mechanics to improve performance of these satellites. Generally, the catalyst is incorporated into a bed that is separate from the solid fuel. Gaseous oxygen (GOX) tanks are also used to initiate the burning of the fuel. Since the catalyst is incorporated into the fuel, a catalyst bed is no longer required. GOX tanks are also removed from the mechanics of the system. This reduces any extra weight and parts to the system which becomes very important for small satellites where weight is a crucial factor. The catalyst infused into the solid fuel grain comes into contact with an ignition source and oxidizer more readily to promote a decrease in latency. The inventive infusion process is safer and more effective than traditional infusion processes.

Market Application

The uses for this technology extend into many different fields including Space Vehicle & Missile Manufacturing, internet, and military applications.

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