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ADVANCED HIGH ENERGY MATERIALS FOR FUTURISTIC LIQUID PROPELLANT ROCKET  
ENGINES PROPELLED SPACE MISSIONS

**Abstract**

Research efforts in liquid propellants are directed to develop efficient propellants in terms of safety and performance. The prevailing issues of low specific impulse, expelling hazardous gases in the exhaust are being worked upon. Of all the methods to enhance propulsive performance, energetic materials are one of the potential sources. In the present work, systematic simulations were carried out on the NASA-CEA software, in which the base composition (MMH/Di-Nitrogen Tetroxide) is present along with the highly energetic materials. The proposed work also involves exploring the specific proportional use of the oxidizer, and fuel in the propellant composition.

Selected energetic fuels, oxidizers and catalysts were tested to understand their effect, extent of effect and related thermochemistry on liquid propellants. The performance was analyzed in terms of change in specific impulse, characteristic velocity and thermodynamic potential. Results shows that high energy materials do affect the liquid propellant performance. Proportional use of energetic material can be trusted to become an accountability for enhanced performance and safety.