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RESEARCH PROGRESS AND FUTURE PROSPECTS OF NOVEL LIQUID PROPELLANT

Abstract

Low cost, high performance and regular launches are the trends of global space activities in the future. The liquid rocket engine is the necessary choice of the power systems of high thrust carrier rockets and deep space probes. As the power source of liquid rocket engines, the liquid propellant generates high-temperature gas and thrust through its combustion or catalytic decomposition. This paper will provide an overview of the development history of the liquid propellant, breakthroughs in key and core technologies, existing technical difficulties and influence of high performance liquid propellant on the engines, including traditional hydrazine-based liquid propellant, low temperature liquid propellant, room temperature green liquid propellant and other novel propellant. According to the development requirements of advanced propulsion technology, the technical development status of new propellants such as in-situ preparation propellant (mar-based or moon-based), ionic liquid based hypergolic propellant and eco-friendly high calorific value propellant are discussed. Finally, the development suggestions of prospective novel liquid propellant in the aspects of high energy, high adaptability and low-toxicity are put forward.