SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Technology (3)

Author: Dr. Anatoliy Serdyuk
The Laboratory of Advanced Jet Propulsions, Ukraine

Mr. Yulian Protsan
The Laboratory of Advanced Jet Propulsion, Ukraine
Dr. Sergiy Bondarenko
Dniepropetrovsk National University, Ukraine

SLURRY-PROPELLANT ROCKET PROPULSION. ECO-SAFETY AND NEW POWER OPPORTUNITIES. TESTS OF NEW PROPELLANTS.

Abstract

There is a growing interest to the use of gel-medium propellants in rocket power plants to reach precise and deep-throttling regulation with multiple starts and variable thrust in space. The LAJP has developed slurry environmentally friendly monopropellant for the operation in space. At the optimal selection of components in recipes the propellant provides the specific impulse 3150 ... 3250 m/s (in a pressure ratio at the chamber and on the cut-section 40/0.02). Temperature of the gas containing mainly nitrogen, hydrogen, carbon dioxide and water, is less than 2350 ... 2400C. It significantly reduces smoke and damage for the environment, creates the possibility of using non-deficient industrial heat-resistant structural materials, without essentially increasing of the weight for the motor thermal protection. At the mixture of slurry propellant (SP), which is forced into the combustion chamber under load, there is the use of the chemical components produced in the industrial scale. In the composition of the propellant at a kind of the oxidizer ammonium DNA and oktogen were used, at a kind of fuel and binder - PMMA with DEGD as active fuel is used aluminum hydride. Rheological properties of the propellant within -10 ... +40C provide its industrial production by the method of free casting. Its dynamic viscosity is changed from 16.000 to 8.500 Poise. The value of the combustion rate in pressure 4...5MPa is adjustable within 7.5...16 mm/s. The effective slurry environmentally friendly propellant composition is presented doing it possible to use in a whole all advantages of non-Newtonian fluid for implementation of deep and rapid throttling of thrust for modern rocket engines.