

SPACE PROPULSION SYMPOSIUM (C4)  
Interactive Presentations (IP)

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OPTIMIZATION OF CATALYTIC BED GEOMETRY FOR 98% HYDROGEN PEROXIDE  
MONOPROPELLANT THRUSTER**Abstract**

Hydrogen peroxide is a well-known chemical used in the past in many propulsive devices. In the 1970's due to low long-term storability characteristics it was replaced with highly toxic hydrazine which offered better performance and was more stable. Modern manufacturing techniques as well as the fact that nowadays many systems are cost and safety driven caused that hydrogen peroxide has been receiving a renewed interest as an alternative propellant for toxic compounds - such as hydrazine. The aim of this paper is to present the process of optimization of catalytic bed geometry for monopropellant thruster using 98% HTP (High Test Peroxide) for different grain sizes and therefore to propose the optimization procedure. In these research conventional 3mm pellet type catalyst carrier was crushed and sieved with 11 different mesh sizes ranging from 8 to 50 (2 – 0,3mm). A thruster prototype was built and the mean mass flow rate was approximately 3g/s . A number of catalytic chambers were tested in order to select the best geometry for a particular grain size. The performance of catalytic chamber was determined mostly on the basis of  $c^*$  efficiency and was compared with the pressure drop along the bed. In this research manganese oxide based catalyst was used and wet impregnation method was implemented.