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Author: Mr. Rawoof Shaik
University of Pisa, Italy, r.shaik@studenti.unipi.it

Dr. Luca Bellucci
University of Pisa, Italy, luca.bellucci@ing.unipi.it

Prof. Luca Labella
University of Pisa, Italy, luca.labella@unipi.it

Mr. Stefano Calatafimi
University of Pisa, Italy, s.calatafimi@studenti.unipi.it

Mr. Elia Puccinelli
University of Pisa, Italy, e.puccinelli3@studenti.unipi.it

Prof. Angelo Pasini
University of Pisa, Italy, angelo.pasini@unipi.it

PRELIMINARY SCREENING OF CATALYTIC BEDS FOR HYDROGEN PEROXIDE THRUSTERS
WITH THRUST LEVEL LOWER THAN 0.5 N**Abstract**

The present work focuses on the experimental investigation of the Platinum enclosed Aluminium Oxide pellet catalytic beds for the decomposition of the Hydrogen Peroxide for monopropellant thrusters. This study is a part of the design of H₂O₂ propulsion for CubeSats to support orbit maneuvering capabilities such as orbit change, altitude change, plane change, and drag compensation over a period. High Test Peroxide (HTP) is chosen over hydrazine as it has a high density, low toxicity, and is easy to handle which makes it a cost-effective player in CubeSat propulsion.

The exclusive test bench is set up to perform the drop tests to assess the performance of the different catalysts. Four types of catalysts of varying diameters (from 30 up to 400 microns) along with the different concentrations of Platinum and types of Aluminium Oxide are used, which were produced by distinctive methods. Platinum is chosen as it is the most favorable catalytic element for the catalytic tasks in the atmospheric and operating conditions for Hydrogen Peroxide decomposition and Alumina as supporting material as suggested by previous experimental studies. The maximum temperatures along with the time required to reach the peak temperature have been recorded by repeatedly dropping the noted volume of 30. Evaluated results are compared with commercial benchmark catalysts test results with different combinations of catalysts with H₂O₂. This work stands as an excellent reference for further investigations in identifying the most promising catalyst for operation in Hydrogen Peroxide thrusters with thrust level lower than 0.5 N.