BULK CATALYST TO SATELLITE PROPULSION

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Most orbiting artificial satellites use chemical propulsive systems, based on the decomposition of a monopropellant, by the action of a catalyst. This work aimed at the development of catalysts based on mixed oxides of cobalt, manganese and aluminum, to be used in the decomposition of hydrogen peroxide (H_2O_2) 90%, allowing the promotion of multiple cold starts in a satellite micropropeller with a nominal thrust of 2 N. The catalysts were prepared by the coprecipitation method in aqueous solution, aiming to obtain materials that presented a high catalytic activity allied to a sufficiently high mechanical resistance to resist the vigorous conditions of pressure and temperature faced inside the the propellant chamber. The activity of the materials was evaluated by the gout test, by carbon monoxide chemisorption and by tests on a theoretical thrust 2 N micropropeller. The prepared catalysts were characterized by Nitrogen Adsorption, X-ray Photoelectron Spectroscopy (XPS), X-ray Diffractometry (XRD) and Mechanical Resistance to Radial Compression, in order to correlate their physicochemical properties with their respective activities in the catalytic decomposition of H_2O_2 90%. The catalysts called MnAl2 and Co4MnAl were the ones that presented the best results, being able to spontaneously decompose the H_2O_2, with a fast and repetitive performance and without undergoing deactivation or fragmentation after the tests.