

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems (1)

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A STUDY OF THE INFLUENCE OF STORAGE TIME OF UNCURED PROPELLANTS ON THE
FINAL PROPERTIES OF THE COMPOSITE IN MULTIBATCH PROCESSES ON AN INDUSTRIAL
SCALE

Abstract

In the Brazilian Aerospace Program, even though all developed rocket motors are manufactured in the same plant of the Department of Aerospace Science and Technology, differences are observed in the magnitude of the masses applied in each motor. Thus, depending on the volume of the combustion chamber, it is common for the casting to carry out multi-batch processes when a required mass of solid propellant is greater than the maximum capacity of the reactor. In this context, the studies that systematically evaluate multi-batch processes on an industrial scale of composite propellants based on polyurethanes obtained from HTPB are incipient. Furthermore, each batch preparation of the casting process for large motors is carried out on different days, so that each of these has a different storage time until the day of the effective casting. As a result, this wait can generate changes in the properties of the propellant grain as a whole, which can modify the motor's performance. Thusly, through the analysis of data of multi-batch processes, the present study evaluated the influence of the storage time in the preparation of the propellant and on the final properties of the grain. It was concluded that the grain becomes softer with a reduction in its hardness, greater elongation at break, and less modulus for batches with longer storage times before casting.