

IAF SPACE PROPULSION SYMPOSIUM (C4)
Solid and Hybrid Propulsion (1) (3)

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BALLISTIC STUDY OF SOLID PROPELLANTS UNDER THE INFLUENCE OF VARYING
PERCENTAGES OF IRON OXIDE**Abstract**

For several decades solid propellants have been responsible in fuelling the dreams of humanity in exploring space. Evolution in solid propellant technology has enabled far reaching benefits to humanity and certainly has elevated space exploration to all new dimensions surpassing known boundaries of space. However, there is still enough room for improvisation in the solid rocket propellant technology in terms of burn rate, burn control and many more. The current study chiefly focuses on a specific methodology by which the influence of various percentages of iron oxide on the burning rate of Ammonium Perchlorate (AP)-Hydroxyl Terminated Poly Butadiene (HTPB) combination solid propellant can be understood. The ballistic modification aided by the addition of various percentages of ferrous metal is experimentally estimated at different thrust chamber pressures using a Crawford Burner test rig. Besides, with image capturing technology, the flame structure of the propellant will be analysed to interpret the presence of primary and secondary zones that further augments the effect of ferrous oxides on the ballistic behaviour of the composite propellant.

Further, with the help of Thermo gravimetric analysis(TGA), the influence of the burn rate modifier on the thermal decomposition process of Ammonium Perchlorate (AP) will be analysed.