IAF SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (2) (6)

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DESIGN AND SIMULATION OF AN IONIC PROPULSION ENGINE WITH PROPOSED AU-GRAPHENE COMPOSITE MATERIAL.

Abstract

The principle of ionic propulsion is based on the creation of electric fields due to a potential difference between two electrodes, if this potential difference is high enough it can ionize, that is, charging the atoms close to the electrodes electrically in this way accelerates the charged particles by going from the cathode to the anode of the system causing more atoms to collide with each other, moving more atoms and creating a chain reaction with the molecules free from the air, causing an impulse by expelling the atoms.

Ionic propulsion is not currently considered an efficient method of propulsion for use on the Earth's surface because it does not generate sufficient thrust to propel off-orbit launch vehicles.

We are looking for new materials to use in existing ion propulsion systems; copper electrodes are now used to generate a beam of ionized electrons between the cathode and anode. By replacing copper with a material with greater conductivity, efficiency and lower resistivity such as Au-Graphene, based on the research we trust that it could generate a greater flow of ions, due to its electrical properties, allowing a considerable increase in the thrust of the system. Graphene is a material that has been discovered to have great properties, making it a great conductor of electrical current, if Au particles are added, Graphene would further increase this current conductivity, making it possible to create junctions and thus be able to mold the electrodes to the needs of each propellant to use it as a viable option.

This paper explains the proposal to use Au-Graphene as electrodes for ion propulsion, experimentally testing, calculating, designing, and constructing a system that can ionize as many atoms per unit area to

achieve the thrust needed for a rocket.