



Structural Analysis of Pyrolytic Graphite Optics for the Hipec Ion Thruster (Paperback)

By -

Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. The long lifetime requirements of interplanetary exploration missions is driving the need to develop long-life components for the electric propulsion thrusters that are being targeted for these missions. One of the primary life-limiting components of ion thrusters are the optics, which are continuously eroded during the operation of the thruster. Pyrolytic graphite optics are being considered for the High Power Electric Propulsion (HiPEP) ion thruster because of their very high resistance to erosion. This paper describes the structural analysis of the HiPEP pyrolytic graphite. A description of the development of the grid model, as well as the development of the effective properties and stress concentrations in the apertured area of the grids is included. An evaluation of the use of curved grids shows that the increased stiffness (compared to flat grids) prevents intergrid impact during launch, however, the residual stresses introduced by curving the grids pushes the resulting peak stresses beyond the critical stress. As a result, flat grids are recommended as the design solution. Thermally induced grid displacements during normal thruster operation are also presented.



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