

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Interactive Presentations - IAF MATERIALS AND STRUCTURES SYMPOSIUM (IP)

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## TESTING OF METALGLASS THROUGH A COMPLIANT MECHANISM

**Abstract**

Throughout the exhaustive research to look for materials for the extreme conditions of space, Metalglass is a very new and very interesting one, because it has the potential to have a lot of applications, and it has not been tested in open space yet. The purpose of this presentation is to open a new area of opportunity for its future research applied in space to test if Metalglass is a good material to build spacecraft with, to be used against the hard conditions of space. Through this work is proposed a metalglass compliant mechanism which, due to specific thermal conditions, occurs an expansion of a polytetrafluoroethylene (PTFE) actuator, which will expand in a way that the length of the final figure is greater than the initial one. This difference in length must be less than 10Metalglass is a compound material, usually consisting of several components that exhibit a high affinity with oxygen and nitrogen, such as Zr, Pt, Ti, Cu, Ni, and Al. Metalglass has some special properties of glass, metal, liquid and solid. It has been proven to be highly resistant to elevated temperatures, to have a low coefficient of friction, PTFE parts exposed for more than 20 years to extreme climatic conditions have shown no alterations in their characteristic properties, and to be resistant to weathering and sunlight; also, it is considered one of the most versatile among the known plastic materials and its usefulness extends to a wide range of products for applications in which other materials cannot be used. Through the simulations and experimentations, the metalglass showed a positive behavior under the mechanical and thermal testings under which it was exposed to. Since 1960, metal glass research has been in development, and now it is very promising, and the fields involved are becoming extensive. The metalglass system is being used from everything from nanomaterials to fuel cell catalysis. The research on its application has just emerged, and there is an enormous deal of exploration and research left. Sadly, we do not know enough about it just yet, including its ability to maintain its performance in a bigger scale. The testings shall continue.