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MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Specialised Technologies, Including Nanotechnology (8)

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PROTOTYPING OF A PHASE CHANGE MATERIAL HEAT STORAGE DEVICE

Abstract

A new concept of Phase Change Materials (PCM) device has recently been developed to improve the thermal control of spacecraft. Two Phase Change Material candidates have been selected after extensive testing of a set of available materials. Special attention has been paid to the hysteresis and ageing. In the design of the container, the thermal expansion of the PCM is a critical parameter that has been taken into consideration by two competing technologies. These designs have been tested: a prototype of PCM heat storage device has been effectively manufactured and tested under vacuum environment. 1D and 2D mathematical models have been developed. The main results of the prototype testing are presented and compared to the mathematical analysis. Conclusions are drawn to promote the use of PCM Heat Storage device in various space missions.