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EXPERIMENTAL STUDY ON THE THERMAL CONTROL DEVICE USING THE SOLID-LIQUID PHASE CHANGE MATERIAL

Abstract

The cyclic working components in spacecraft requires the adquate radiator area to remove heat dissipation during the working period and the heaters may be installed to prevent the temperature down below the design limit during the off-duty period. The solid-liquid phase change material(PCM) is a good candidate as a efficient thermal control device, thereby reducing the radiator area and heater power. The latent heat of PCM melting alleviates the drastic temperature increase and that of PCM solidification retains the temperature during the cooling period. In present study the PCM thermal control device combined with the heatpipe is designed and manufactured. The experiments are performed for it to investigate its function and reliability. From the experimental results the developed device is very efficient to temperature control of the cyclic heating components.