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PARAMETRIC STUDY ON THE DESIGN OF THE THERMAL CONTROL EQUIPMENT USING  
THE PHASE CHANGE MATERIAL

**Abstract**

The high power consumption and intermittently working components in satellite, such as optical imaging device, require the adequate radiator area to remove heat dissipation during the on-duty 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 an 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 research, the effect of important design parameters such as amount of heat dissipation, component duty time, mass of PCM, and radiator cooling capacity are experimentally studied. The design guide lines are suggested based on the governing parameters. Only a small amount of PCM plays a role to relieve the rapid temperature change and it means the effectiveness of PCM.