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弹用热流传感器敏感元件的热传导模型研究(PDF)

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Title: Heat Transfer Model of Sensitive Element of Heat Flux Sensor for Missiles

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关键词: [热流传感器](#); [康铜箔](#); [敏感元件](#); [热传导系数](#); [热电偶](#); [热传导模型](#)

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摘要: 为研究导弹燃气发出热流对弹体的影响,采用热流传感器测量其热流的变化。基于热传导原理热流传感器敏感元件——康铜箔上接收热流并形成温度差,利用镍铬-康铜热电偶将温度差转换为输出热流信号。考虑了热传导系数为温度的非线性函数这一特点的基础上,对敏感元件进行导热过程分析,建立了热传导模型,编写热传导程序,得到热流输出信号与被测热流的关系,通过校准试验测得数据进行对比,验证模型的正确性。

Abstract: In order to study the impact of heat flux on missile body discharging by missile gas,the change of heat flux was measured by heat flux sensor. Using NiCr-Constantan foil thermocouple for temperature difference that formed by receiving the heat flux from sensitive element-Constantan foil based on the theory of heat conduction into heat flux signal. The relationship between heat flux density and output signal of heat flux was worked out with analysis on conduction process and a heat transfer model was developed based on nonlinearity of thermal conductivity relative to temperature that had been considered, program of heat transfer was compiled. Through comparing calculated value with measured value, the accuracy of the model was proved.

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