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论文

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一种用于电子薄膜导热系数和发射率测量的实验方案

余雷¹, 余建祖¹, 高泽溪²

1. 北京航空航天大学飞行器设计与应用力学系, 北京 100083; 2. 北京航空航天大学电子工程系, 北京 100083

METHOD OF DETERMINATION OF THERMAL CONDUCTIVITY AND EMISSIVITY OF ELECTRONIC THIN FILMS

YU Lei¹, YU Jian-zu¹, GAO Ze-xi²

1. Dept. of Flight Vehicle Design and Applied Mechanics, Beijing University of Aeronautics and Astronautics, Beijing 100083, China; 2. Dept. of Electronic Engineering, Beijing University of Aeronautics and Astronautics, Beijing 100083, China

摘要

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摘要 薄膜传热性能对微电子设备的传热能力及其性能和可靠性有重大影响,测量薄膜的热物性参数并进一步研究其影响因素,可为微电子电路的设计和提供科学依据。评述了薄膜导热系数测量和研究的现状,在此基础上提出了一种新的能同时测量衬底薄膜导热系数和发射率的实验方案,并通过建立衬底薄膜试样传热的数学模型和分析推导,论证了该实验方案的可行性。本实验方案可推广应用于确定淀积在衬底薄膜上各种极小厚度薄膜的导热系数和发射率

关键词: 薄膜 热物性参数 导热系数 发射率 测量技术

Abstract: The heat transferring performance of thin films governs the heat transfer characteristics, performance and reliability of the microelectronic devices in which they are used. Measurements of thermal properties of these thin films and further studies on their influence factors can provide the scientific basis for the design and development of microelectronic circuits. This paper reviews the state of the art of measurements and studies on thermal conductivity of thin films. Based on the fact that a new experimental method is presented which allows to measure the thermal conductivity and the emissivity of substrate foils simultaneously. Through founding the heat transfer mathematical models for the test samples of substrate foils and making analytical derivation, the feasibility of this method is demonstrated. The same properties can also be determined for extreme thin films deposited on the substrate foils. Furthermore, the influence of substrate foils on the whole heat transport effects can preferably be separated and the certainty of measurement can also be increased.

Keywords: thin film thermal property thermal conductivity emissivity measuring method

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