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## Bi<sub>2</sub>Te<sub>3</sub>基热电材料的研究现状及发展

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**摘要** 热电材料是能将热能和电能直接相互转化的功能材料,它的出现为解决能源紧缺和环境污染提供了广阔的应用前景。从理论和实验两个方面对Bi<sub>2</sub>Te<sub>3</sub>基热电材料近年来国内外的研究现状及发展进行了简要介绍和评述,并指出了今后的发展方向。在理论上主要基于能带理论、半导体超晶格以及密度泛函理论去寻求影响该材料的相关因子,在实验上主要采用分子束外延、激光脉冲沉积、合金化和水热合成法等方法制备该热电材料。

**关键词** 热电材料 Bi<sub>2</sub>Te<sub>3</sub> Seebeck系数 电导率 热导率

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## Current Status and Development of Bi<sub>2</sub>Te<sub>3</sub>-based Thermoelectric Materials

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**Abstract** Thermoelectric material is a kind of material which is used for the direct transfer between thermal energy and electric energy, and its usage helps solve the problem of energy shortage and environmental pollution. Based on theories and experiments, the researches and development of Bi<sub>2</sub>Te<sub>3</sub>-based thermoelectric materials in recent years are introduced and reviewed briefly in this paper. And its perspectives of practical application are also pointed out. In the paper, the relevant factors that will influence thermoelectric material are explored mainly based on band-energy theory, semiconductor super-crystal and density functional theory. In the course of the experiment, thermoelectric materials are prepared mainly by molecular-beam epitaxy, pushed laser deposition technology, alloying technology and hydrothermal synthesis and so on.

**Key words** thermoelectric material, Bi<sub>2</sub>Te<sub>3</sub>, Seebeck coefficient, electric conductivity, thermal conductivity

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