

材料化学工程与纳米技术

## 聚合物基导热复合材料的性能及导热机理

李宾, 刘妍, 孙斌, 潘敏, 戴干策

华东理工大学化学工程联合国家重点实验室;华东理工大学机械与动力工程学院

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摘要

采用不同品种、粒径的导热填料和基体树脂,以熔融共混方法制备聚合物/填料体系导热功能复合材料。研究了复合材料热导率 $\lambda$ 和体积电阻率 $\rho_v$ 随不同填料、粒径等因素的变化规律及其内在原因。不同填充体系的热导率均随填料粒径的减小而降低,而电导率则相反;复合体系热导率随填料含量的增加始终呈逐步上升趋势,未表现出电导率那样的急剧变化。研究表明:复合体系热导率和电导率变化的差异主要是由于二者具有不同的传导机理;复合材料热导率的变化规律可以用热弹性复合增强机制进行合理解释。

关键词

[聚合物复合材料](#) [热导率](#) [导热机理](#)

分类号

## Properties and heat-conduction mechanism of thermally conductive polymer composites

LI Bin,LIU Yan,SUN Bin,PAN Min,DAI Gance

### Abstract

The thermally conductive (TC) polymer composites filled with thermally conductive inorganic fillers were prepared with melt mixing.The influence of such essential factors as size and filler material on the thermal conductivity and electrical resistivity of the composites was investigated.The results showed that with the reduction of filler size, the thermal conductivity of the composites decreased, however the electrical conductivity increased, and that with increasing volume fraction of filler, the thermal conductivity of composites rose gradually.The changes in the thermal conductivity of composites were not as rapid as those of the electrical conductivity of composites.A mechanism was suggested to explain the difference mentioned above between the thermal conductivity and the electrical conductivity of the compositesHeat conduction of the composites may be due to thermal vibration transmission.

### Key words

[polymer composite](#) [thermal conductivity](#) [heat-conduction mechanism](#)

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