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## 石墨对E-51环氧树脂体系微波固化速率的影响

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## Investigation of the Effect of Graphite on Microwave Curing Rates of E-51 Epoxy Resin Systems

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摘要

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### 摘要

为了探索微波吸收剂石墨对双酚A型环氧E-51树脂体系微波固化速率的影响, 选用环氧E-51+甲基四氢邻苯二甲酸酐 (MeTHPA)、E-51+650低分子聚酰胺和E-51+二氨基二苯甲烷 (DDM) 为树脂体系, 采用经改造的微波加热设备为微波源, 利用差示扫描量热法 (DSC) 测试树脂体系的固化度, SEM表征石墨在树脂基体中的分散效果, 分别研究了石墨的添加量和分散方式对树脂体系微波固化反应速率的影响。研究表明: 随着微波吸收剂添加量的增加, 3种环氧树脂体系的微波固化反应速率均呈现出先迅速增加后趋于平缓的变化趋势, 区别在于吸收剂的添加量范围不同; 超声分散能进一步加速环氧E-51+MeTHPA树脂体系的微波固化反应; 吸收剂能提高树脂体系的吸波能力进而加速其微波固化反应。

关键词: 微波固化 石墨 环氧树脂 超声分散 复合材料

### Abstract:

The effect of the amounts and dispersion methods of microwave-absorber graphite on microwave curing rates are studied for the E-51 systems cured with MeTHPA, 650 and DDM agents, respectively. The modified commercial microwave oven is employed as the radiation source, and the differential scanning calorimetry (DSC) as the measure method for curing degree. The dispersion of graphite in the resin matrix is characterized by means of SEM. The results show that the curing rates of all epoxy resin systems are raised with the addition of the graphite power, which increases very fast at lower additive amounts and tend to be slight at higher ones, while the relations between the acceleration extent with the doping amount of the graphite power of the three systems are different. And the microwave curing reaction can be accelerated further by taking the ultrasonic dispersion as the mixing process. Importantly, the mechanism is described as that the addition of microwave-absorber can improve the microwave absorbing performance of resin matrix so that the microwave curing reaction is accelerated.

Keywords: microwave curing graphite epoxy resin ultrasonic dispersion composites

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