聚酰亚胺改性环氧树脂的力学性能测试和断面显微形貌观察

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【摘要】 **目的** 测试自行合成的聚酰亚胺与环氧树脂共混改性产物的力学性能，观察其断面显微形貌，以探索改性后的环氧树脂材料增强的效果。**方法** 将自行合成的聚酰亚胺与 E-51 环氧树脂共混得到改性环氧树脂，按不同材料、不同配比分组后进行三点抗弯试验、剪切粘接强度测试和断面形态的扫描电镜观察。**结果** 聚酰亚胺-环氧树脂共混产物抗弯强度最高可达（141.03±9.93）MPa，比纯环氧树脂（抗弯强度（112.05±8.81）MPa）提高了 25.86%（P<0.05）；断裂伸长为（2.06±0.24）mm，比纯环氧树脂的断裂伸长（1.54±0.24）mm 提高了 33.77%（P<0.05）；改性后对弹性模量和粘接强度无明显变化（P>0 .05）。扫描电镜下可见聚酰亚胺-3 改性的环氧树脂断面光滑，未见明显微裂纹。**结论** 聚酰亚胺可用于环氧树脂的共混改性，在适当配比（25phr）下具有理想的增强效果。

【关键词】 聚酰亚胺 环氧树脂 力学性能 显微形貌

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Mechanical properties and microscopic observation of fracture morphology of polyimide modified epoxy resins

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【Abstract】 **Object** In this study the mechanical properties and fracture morphology of self-made polyimide-epoxy (PI/EP) composition was tested to investigate whether blending epoxy with polyimide was an effective way to strengthen epoxy. **Methods** The polyimide modified epoxy was grouped according to different modification and proportion, then characterized by 3 point bending test, shear-bonding test and scanning electron microscopy. **Results** The flexural strength of epoxy-polyimide blend could be as high as 141.03±9.93MPa, which was 25.86% higher than the control group (112.05±8.81MPa)(P<0.05), and its breaking elongation (2.06±0.24mm) was 33.77% higher than the control group (1.54±0.24mm)(P<0.05), no significant difference was observed in flexural modulus and shear-bonding strength (P>0.05). The fracture morphology was smooth and no obvious crack was observed in the fracture surface. **Conclusion** Blending polyimide with epoxy in proper proportion (25phr) could be a workable way to strengthen epoxy.

【Key Words】 Polyimide Epoxy Mechanical property Micro morphology

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