绿色航空复合材料技术的中欧联合研发
Joint R&D of Composite Materials for GREEN Aviation

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摘要/Abstract

今日航空工业中应用的碳纤维、玻璃纤维、以及树脂材料均来自化石资源，生物质资源的纤维和树脂在航空工业还没有应用的先例。在中欧合作的框架下，一个名为 ECO-COMPASS 的项目为生物质材料潜在的航空应用掀开了序幕。本文将报告天然纤维材料用作复合材料增强材料和芯材，生物质树脂用于替代传统的双酚 A 环氧树脂，以及这种绿色复合材料在飞机次承力及内饰结构的考核验证进展等。与此同时，相应的防护技术也被研究开发，以减低过程的环境影响，提高产品的阻燃性能，满足航空工业的安全要求等。建模仿真技术被用来优化材料的开发应用，“生命周期评价（LCA）”技术被引进来比较绿色材料技术与现行传统材料技术的环境效应等。Today, only man-made materials like carbon and glass fibres in conjunction with the fossil-sourced polymers are used to produce composite parts in aviation. Renewable materials like natural fibres or bio-sourced resin systems have not found their way into aviation, yet. In the China-EU cooperation framework, a joint project named ECO-COMPASS is going on aiming to evaluate the potential applications of the resource-friendly composite materials in the aviation. In the paper, natural fibres used for different types of reinforcements and sandwich cores, and the bio-based resins to substitute standard bisphenol-A based epoxies in secondary and interior structures will be presented and demonstrated. Adapted material protection technologies to reduce environmental influence and to improve fire resistance will be reported to fulfil the demanding safety requirements in aviation. Furthermore, modelling and simulation of chosen eco-composites aims for an optimized use of materials while a Life Cycle Assessment (LCA) aims to prove the ecological advantages compared to synthetic state-of-the-art materials.

关键词 KEYWORDS: 植物纤维 PLANT FIBERS, 松香基环氧 ROSIN-SOURCED EPOXIES, 绿色复合材料 GREEM COMPOSITES

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