

研究论文

环境因素对PBO纤维老化的影响和储存寿命预测

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**摘要:** 研究了紫外光、湿度和温度等环境条件对聚对亚苯基苯并二噁唑(PBO)纤维老化的影响, 并对PBO纤维在常规环境下的储存和使用寿命预测进行了初步分析。结果表明: 在PBO纤维的老化过程中, 紫外光照射造成纤维表皮的强烈破坏, 使其强度大幅降低; 水分子向纤维内部渗透, 使其加速老化和强度降低; 温度的升高促进水分子向纤维内部渗透和活动。在避光和避水条件下, PBO纤维具有相当高的耐热氧化性能。

**关键词:** 有机高分子材料, 聚对亚苯基苯并二噁唑纤维 老化 寿命预测

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**Abstract:** The effects of moisture, heat and UV light on the aging behave, the storage life and usage life of poly-p-phenylenebenzobisoxazole (PBO) fiber were investigated. It was found that the aging behaves of PBO fiber was susceptible to UV light. The cortex of the fiber was damaged severely during the 192 h accelerated UV light aging period, which led to significant reduction of tensile strength of fiber. The moisture had an evidently negative effect on the aging behaves of PBO fiber whether aging with UV light or not, and the effect was more obvious when exposed to UV light. The possible mechanism was the penetration of water molecules into the fiber's interior, which led to the formation of microfibril and the decline of fiber tensile strength. Increasing aging temperature can promote the penetration ability of water molecules, which speeded the decline of fiber tensile strength. The fibers aging in high humidity environments at a fixed temperature degraded more quickly. PBO fiber had excellent stability in isolation from moisture and ultraviolet radiation.

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