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FULL PAPERS

FTIR-ATR技术研究聚氨酯类文物保护材料的光降解

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摘要 聚氨酯是一类使用得非常普遍的文物保护材料。本文对HDI-聚氨酯、TDI-聚氨酯和MDI-聚氨酯三种聚氨酯材料进行了紫外线照射人工老化降解，采用傅立叶变换-衰减全反射红外光谱技术(FTIR-ATR)对其进行了监测。实验证实了聚氨酯类材料的光降解机理是氨基甲酸酯键的断裂、断裂后形成的自由基再发生反应的老化机理。我们认为在这3个聚氨酯中，属于脂肪族的HDI-聚氨酯的老化产物颜色改变最小，更适宜于作为文物保护材料来使用。

关键词 聚氨酯, 傅立叶变换-衰减全反射红外光谱, 光降解

分类号

Photochemical Degradation Study of Polyurethanes as Relic Protection Materials by FTIR-ATR

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Abstract Polyurethanesare one kind of relic protection materials commonly used. During artificial photo-ageing, three polyurethanes, HDI-based polyurethane, MDI-based polyurethane and TDI-based polyurethane, have been considered to undergo UV radiation. Photochemical degradation of the polyurethanes has been monitored by means of Fourier transform infrared spectroscopy with attenuated total reflection accessory (FTIR-ATR). It was proved that the mechanism of the photochemical degradation of polyurethanes might be the scissions of carbamate (urethane) groupsand the re-reactions of radical groups formed in the scission reactions. From the experiment results HDI-based polyurethane, an aliphatic diisocyanate, could be considered to be more suitably used as relic protection materials among these three polyurethanes for its ageing products with less color.

Key words polyurethane FTIR-ATR photochemical degradation

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